LITTLE NACHES RIVER PASSAGE PROJECT

Annual Report FY90 and FY89

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Project No. 86-75

Contract Number DE-AI79-86BP60266

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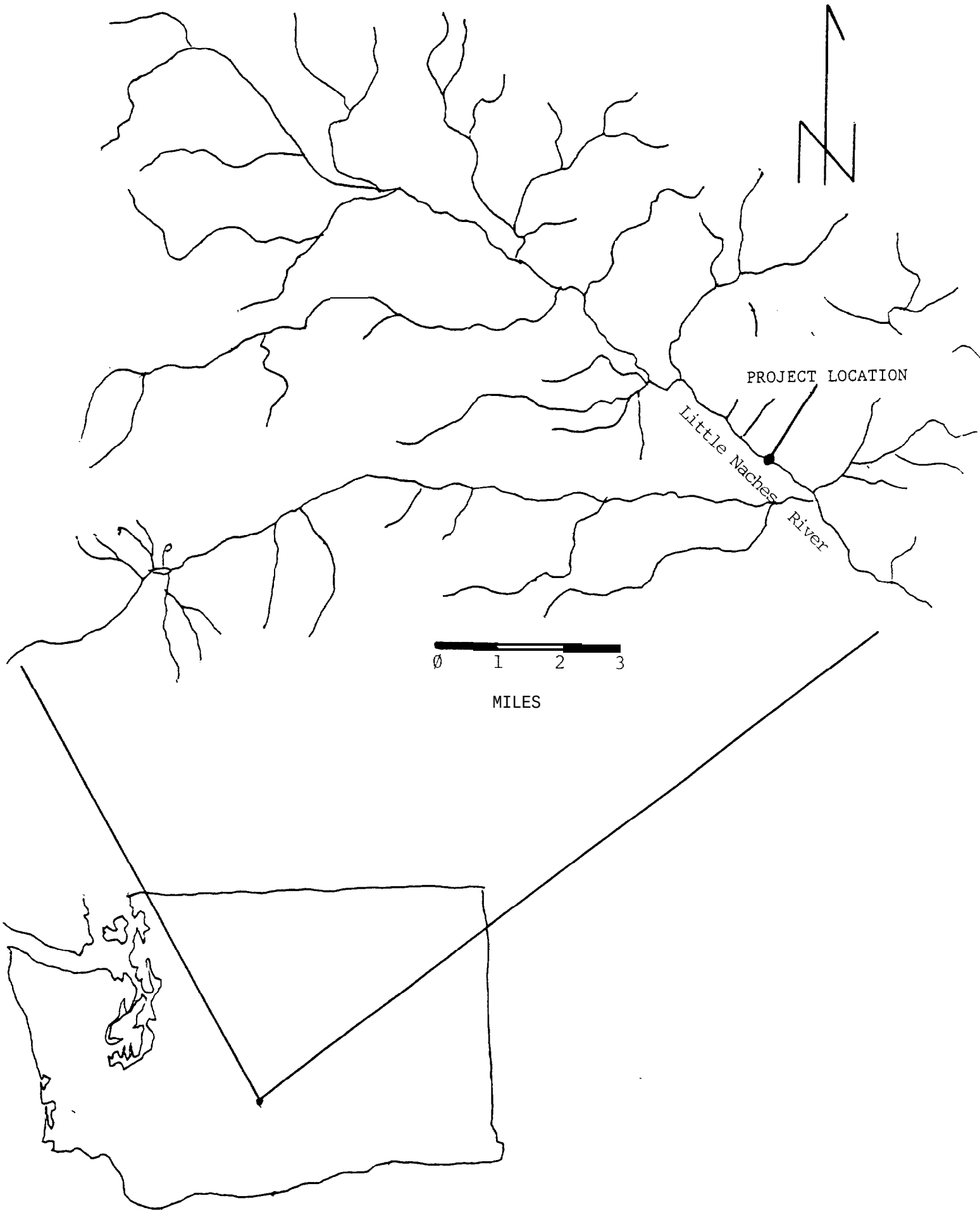
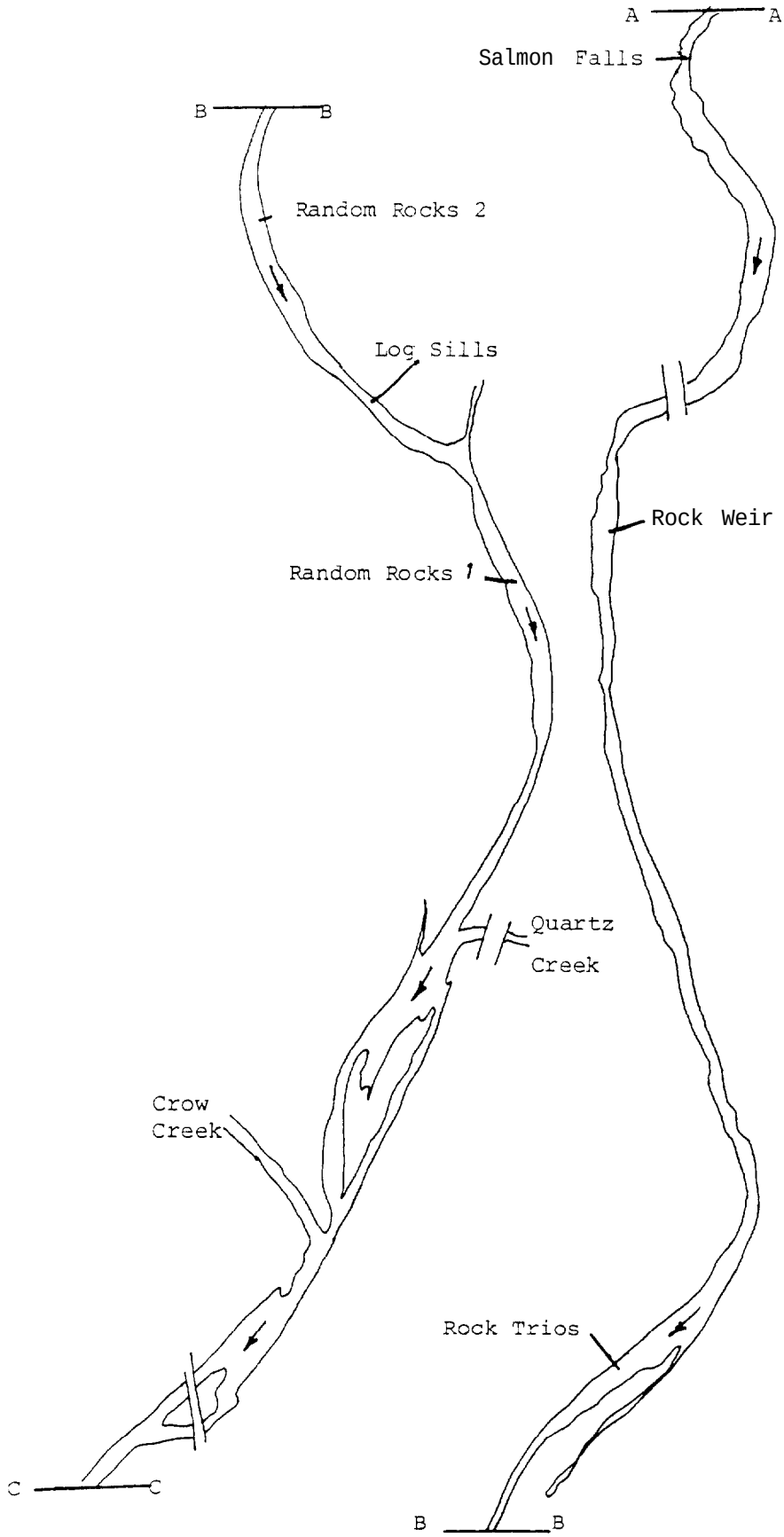
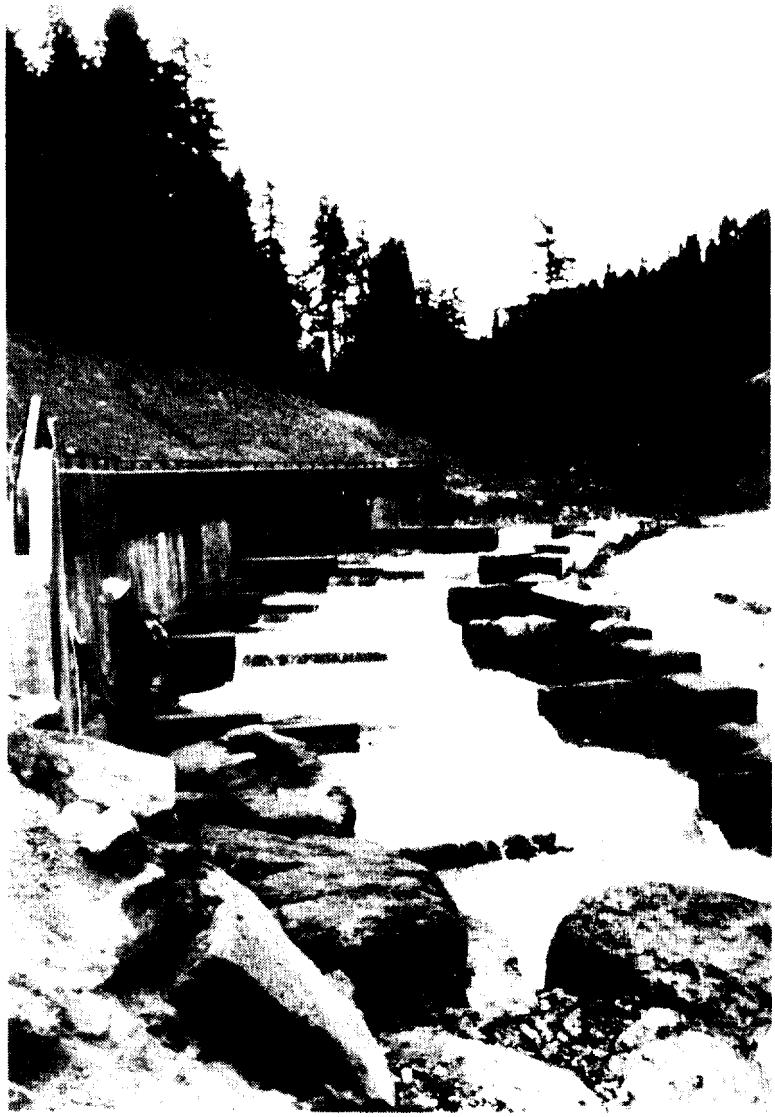

PROJECT LOCATION
Little Naches River
Ø 1 2 3
MILES



Map showing location of transects established to monitor effects of instrearn structures placed in Little Naches River.



SALMON FALLS FISHLADDER
400 CFS MAY 27, 1988

SALMON FALLS FISHLADDER
FLOOD EVENT NOVEMBER 25, 1990

ABSTRACT

As part of the implementation of section 704d(1) of the Northwest Power Planning Council's **Fish and Wildlife Program,** the USDA Forest Service received funding from the Bonneville Power Administration to improve passage for anadromous salmonids on the Little Naches River: tributary to the Naches, Yakima, and Columbia Rivers. The project's goal was to provide anadromous salmonid access to an additional 24 miles of stream habitat in the Little Naches River and its tributaries. The target species for this project are chinook salmon (Oncorhynchus tshawytscha), steelhead trout (Oncorhynchus mykiss), and potentially coho salmon (Oncorhynchus kisutch).

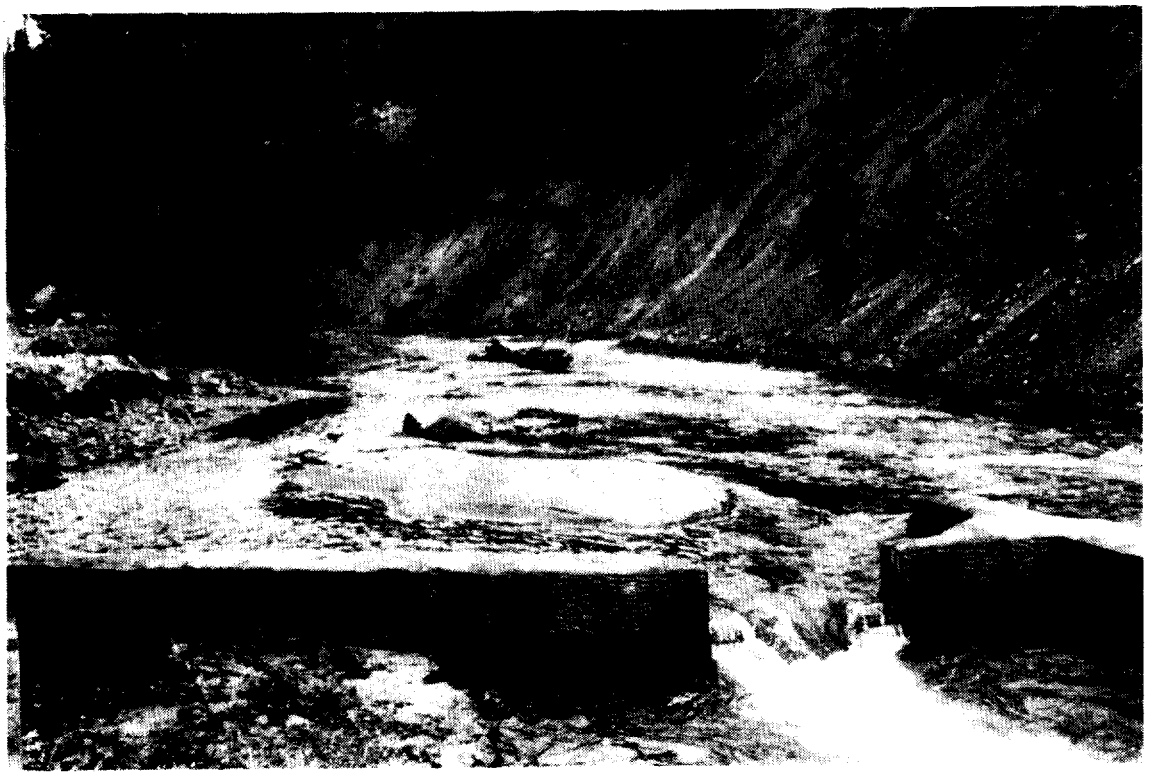
The project was divided into two subprojects. The first consisted of the construction and maintenance of a concrete fishway to allow anadromous salmonid passage at Salmon Falls. The second sub-project rehabilitated the stream channel below Salmon Falls to permit fish migration to the Falls during low flows.

Both subprojects were completed in 1987, essentially on budget. This report documents the monitoring and maintenance work performed to date.

The fishway and instream structures installed at the rehabilitation site appear to be functioning as planned. Chinook salmon redds were found in the Little Naches River above Salmon Falls in 1988, 1989, and 1990.

Riparian vegetation in the floodplain of the rehabilitated river section appears to be increasing.

Maintenance activities on the stream rehabilitation structures were determined not to be necessary during the regular monitoring completed in August 1990. Since then, the Little Naches River experienced a very large flood as a result of the heavy storms that hit Washington State on the weekend after Thanksgiving (11/25/90). The only information available to date on the size of this event is a reported 6.99 inches of rain in the nearby Bumping River drainage over the three days preceding the flood. Substantial damage occurred to the instream structures, and flood relief money has been requested for repairs.



SALMON FALLS FISHLADDER
UPSTREAM END JULY 1988
GRAVEL BAR NEAR EXIT

UPSTREAM END OF SALMON FALLS FISHLADDER
FLOOD EVENT NOVEMBER 25, 1990
EROSION ON LEFT BANK

INTRODUCTION

As part of the implementation of section 704d(1) of the Northwest Power Planning Council's **Fish and Wildlife Program,** the USDA Forest Service (USFS) received funding from the Bonneville Power Administration (BPA) to improve passage for anadromous salmonids on the Little Naches River: tributary to the Naches, Yakima, and Columbia Rivers. In 1987, under contract (Agreement DE-AI79-86BP60266, Project 86-75) with BPA the USFS completed a project to improve fish passage so that anadromous salmonids could access approximately 24 stream miles of habitat in the upper portions of the Little Naches River and it's tributaries. The target species for this project were chinook salmon (Oncorhynchus tshawytscha), steelhead trout (Oncorhynchus mykiss), and potentially coho salmon (Oncorhynchus kisutch).

The project was divided into two sub-projects. The first consisted of the construction of a concrete fishway to enhance anadromous salmonid passage at Salmon Falls (River Mile 4.4). The second sub-project rehabilitated the stream channel below Salmon Falls (River Mile 3.2-4.3) to permit summer low flow fish migration to the Falls. Both sub-projects were completed in 1987. This report describes the monitoring and maintenance activities to date.

DESCRIPTION OF STUDY AREA

Around 1965, the Washington Department of Fisheries attempted to enhance fish passage over Salmon Falls by using explosives to excavate a crude, shallow channel around the right side (looking downstream) of the falls. This effort was partially successful since small numbers of adult salmon were observed spawning above the falls during the later 1960's. However, several major floods in the 1970's damaged the channel which resulted in its collapse and filling in with rock debris.

The same floods that rendered the passage channel in-operable, also severely damaged the channel downstream between the Falls and Crow Creek by widening the river bed and depositing large amounts of gravel, sand and rubble. Subsequently, the USFS performed a flood rehabilitation project and pushed most of the accumulated bedload into berms on either side of the excavated channel. This work was done to protect the nearby road and a campground from future flood damage and to provide surface flow during the summer months (the year prior to bedload removal, most summer flow was subsurface). The river was still too wide and shallow to permit satisfactory adult anadromous fish passage during low flows. The channel was still unstable and riparian vegetation was not re-established. After the floods of the 1970's and before the 1987 construction no salmon had been observed spawning above the mouth of Quartz Creek, apparently due to this habitat damage and passage problem.

SALMON FALLS FISHLADDER
DOWNSTREAM END NEAR BALANCING ROCK
AUGUST 1, 1989

SALMON FALLS FISHLADDER
DOWNSTREAM END NEAR BALANCING ROCK
FLOOD EVENT NOVEMBER 25, 1990

This two-part rehabilitation project was completed in 1987 and is estimated to provide access to 17 stream miles (51 acres) of chinook salmon habitat, 19 stream miles (53 acres) of coho salmon habitat, and 24 stream miles (67 acres) of steelhead trout habitat. Annual anadromous salmonid production potential is estimated to be 29,500 chinook smolts, 35,500 coho smolts, and 6,500 steelhead trout smolts. Spawning chinook salmon have been observed above the Falls each year since the rehabilitation project was completed.

RESULTS AND DISCUSSION

Sub-project I– Salmon Falls Fishway

The fishway was drained on July 23, 1990 and examined for bedload accumulation and wear. The structure appears to be functioning well and no major maintenance problems were noted. Only one weir orifice was completely blocked by gravel backed up against water-logged debris. This orifice was successfully unplugged while the fishway was dewatered. An adult chinook salmon was returned to the river after it was stranded in a drained fishway pool.

A gravel bar has formed just upstream of the fishway since it was completed in November 1987. The bar was not creating any passage problems until the flood event on November 25, 1990. After that event the bar increased in size and diverted the entire river flow away from the ladder and over the Falls. It previously had been suggested that the fishway exit (upstream end) be blocked during high flows in an effort to direct more of the bedload over the falls and allow less into the fishway. The fishway exit was boarded this winter to test this hypothesis, and may have contributed to the increased bedload deposition on the bar.

In 1988, five chinook salmon redds were located upstream of Salmon Falls fishway and thirty-six redds were located downstream in the Little Naches River. In 1989, nine chinook salmon redds were marked upstream of Salmon Falls and forty-four redds were located downstream. This year, eleven chinook salmon redds were identified upstream of the fishway and forty were located downstream. The uppermost redd above the fishway was higher in the drainage (near the confluence with the Middle Fork Little Naches River) than any in previous years.

A preliminary survey of the fishway after the flood event on November 25, 1990 indicated that the structure is intact. Increased erosion on the streambank at the top of the Falls appears not to have adversely affected the anchoring of the concrete grade control structure. The concrete structure itself may have sustained some damage (pieces chipped off). Until a more thorough evaluation can be made, the only other observed impact is a substantial collection of bedload in the pools. Flood relief funds have been applied for to survey and repair any damage to the fishway.

LOOKING UPSTREAM FROM QUARTZ CREEK BRIDGE
FLOOD EVENT NOVEMBER 25, 1990

LOOKING UPSTEAM FROM QUARTZ CREEK BRIDGE
180 CFS DECEMBER 6, 1990
INCREASED BRAIDING AFTER FLOOD EVENT

Sub-project II-Channel Rehabilitation

The channel rehabilitation structures were re-examined during regular monitoring this summer- some of them had been damaged by hfgh flows. The headcut through the lower two log weirs is continuing upstream to the third log weir. An overflow channel around the log weirs is gradually capturing more of the main river flow. Four rock V-weirs have rocks that have rolled out of place. However, it appears that the structures have functioned as designed and maintained summer low flow fish passage in the channel immediately downstream from the Salmon Falls.

The flood event in November 1990 changed the above assessment dramatically. All of the log weirs are gone. Clusters of large rocks are still visible, especially near the log and rock weir keyways. Other than that, most of the rock weirs are completely gone or sufficiently altered in shape so that they no longer perform their designed function. Increased braiding of the river on the flood plain may produce alternate main channels, Passage problems are anticipated in several locations during 1991 summer low flows. A request for flood relief funding for the needed repairs has been made, but no response has been received to date.

Stream channel cross-sections were established in 1987 to monitor the effects of the instream structures. Sets of 5 transects spaced 10 feet apart were set up for the upstream-most log weir, 2 random rock sections, a rock trio grouping, and a rock weir, Elevations were measured to the nearest tenth of a foot. Graphs of the transect data collected in 1987, 1988, 1989, and 1990 are attached to this report.

1) RANDOM ROCKS 1- The channel cross sections appear generally unchanged over the last four years. For 1990, transect #1 has a peak at 33 feet that occurs on a boulder, and the far bank may be higher because it is on a steep riprapped area that could have shifted.
2) LOG SILLS- The channel cross sections appear unchanged over the last four years, except the 1989 and 1990 elevations are approximately a foot lower than the 1988 and 1987 elevations. This is most likely an error in the 1989 field notes, as this portion of the channel does not visually appear to have changed much since the structure was installed in 1986 (1990 starting elevation was generated from the mistaken 1989 elevation). The last four springs have not produced large enough flood events to cause any significant channel changes. The recent November 1990 flood exposed the previously buried downstream-most log sill, and stream channel braiding was greatly increased in this area and downstream.
3) RANDOM ROCKS 2- The channel cross sections appear unchanged over the last four years. The far bank downstream of this area experienced a considerable amount of erosion during the recent flood in November (a section approximately 100 ft. long, 10 ft. high, and 15 ft. wide).
4) ROCK TRIOS- The channel cross sections appear unchanged over the last four years. The headcut in the downstream area of the log weirs moved up to the rock trio transects area during the November flood. The

RANDOM ROCKS 1 VICINITY
30 CFS AUGUST 24, 1989

RANDOM ROCKS VICINITY
FLOOD EVENT NOVEMBER 25, 1990

overflow channel around the log weir location appears to have increased in size also.

ROCK WEIR- The channel cross sections appear unchanged over the last four years. There is an unexplained blip in the data for transect 3 (1989). The channel elevation 30 to 37 feet from the left bank (looking downstream) appears 3-4 feet higher than the channel bottom on either side, this is an obvious field note error or indication of a large boulder that has shifted position from the middle of the weir. The "benches" in the 1990 line at about 23 and 43 feet are boulders that are part of the rock weir. The flood in November 1990 destroyed the lower four rock weirs in this area and shifted the boulders in the remaining three weirs. Endcutting occurred around both ends of all the weirs.

Photo points were established in 1987 at 64 relocatable sites in the floodplain of the rehabilitated section of river. Photographs were taken at each of these sites in August or early September in 1987, 1988, 1989, and 1990.

1) Fifty of the photos showed vegetative increases. Increases were noted as taller, broader bushes or forb clumps and new plants. Most of the new plants were forbes on disturbed or rocky areas. Some new woody plants were found in areas that had silt deposits.
2) Eight of the photos showed no change. These areas were extremely rocky and had no vegetation in 1987. A few of the small trees and woody shrubs showed apparent evidence of fertilizer burn from fertilizer spread in 1987. Others were stunted with signs of heavy grazing by deer and elk.
3) Six of the photos showed vegetative decreases. There are a few willow and cottonwood shoots (planted in 1986) that died after 1987. Other areas showed signs of severe deer and elk grazing.

Overall, the riparian vegetation is re-establishing itself in the floodplain of the rehabilitated section of stream channel. The greatest gain is in the wide areas that are close in elevation to the river. Slower progress has occurred in the uplands that have suffered a lowered water table due to the channelization and erosion experienced by this stretch of river. This visual monitoring will continue on a yearly basis and should document even greater changes as time passes. Though the visual survey after the flooding this fall was cursory, it appears that little damage was done to the riparian vegetation.

SUMMARY AND CONCLUSIONS

The fishway and instream structures installed at the rehabilitation site were functioning as designed before the flood event in November 1990. Chinook salmon redds were found in the Little Naches River above Salmon Falls in 1988, 1989, and 1990.

Although bedload accumulations which plug some of the weir orifices are occurring, the orifices are easily cleaned (for the most part). A more

UPSTREAM FROM LOG SILLS
AUGUST 4, 1988

UPSTREAM FROM LOG SILLS AFTER FLOOD EVENT
180 CFS DECEMBER 6, 1990
EROSION, ESPECIALLY ON RIGHT BANK

thorough survey this coming summer of increased deposition from the flood will be followed by any necessary cleaning.

Stream channel cross sections established in 1987 were surveyed in 1988, 1989, and 1990. Both 1988 and 1989 were low event years. Significant channel changes occurred during a high flow event in fall of 1990. Some permanent markers from the cross sections have been located since the flood, perhaps allowing measurement of the channel changes this coming summer,

Maintenance activities on the stream rehabilitation structures were determined not to be necessary during the 1990 summer season. Thorough surveys of the flood damage will occur this coming field season. Flood relief monies have been requested to finance any needed repairs.

Riparian vegetation in the floodplain of the rehabilitated river section appears to be increasing in 78%, remaining the same in 13%, and decreasing in 9% of the established photo points. Initial cursory surveys indicated minimal vegetation loss from the flood event except on streambanks that sustained significant erosion. A thorough survey will occur in conjunction with the flood repairs.

UPSTREAM FROM ROCK TRIOS
AUGUST 27, 1987

UPSTREAM FROM ROCK TRIOS
FLOOD EVENT NOVEMBER 25, 1990

SUMMARY OF EXPENDITURES

Agreement DE-AI79-86BP60266
Project 86-75

1990 EXPENDITURES

ITEM	JAN-OCT	NOV-DEC*	1990 TOTALS
PERSONNEL	$ 547.27	$ 200.00	$ 747.27
TRAVEL/TRANS.	226.32	50.00	276.32
MATERIALS	32.07	50.00	82.07
GENERAL ADMIN.	128.91	40.00	168.91
TOTAL	**$ 934.57**	$ 340.00	$ 1274.57

* January through October expenses are those actually billed BPA. November through December expenses are estimated.

VEGETATION PHOTO POINT
LOOKING NW ALONG BERM FROM LOG SILL AREA
AUGUST 27, 1987

VEGETATION PHOTO POINT
LOOKING NW ALONG BERM FROM LOG SILL AREA
AUGUST 30, 1990

MATERIAL ON FILE AT NACHES RANGER DISTRICT

Salmon Falls Fishway Construction and Safety Modification Construction Daily Diaries written by project COR John Fahsholtz and project inspectors Dan Soptich and Bev Ryder are located in the engineering department.

Diagrams showing locations of instream structures that were placed iin the Rehabilitation Area and location of cross sections established to monitor future changes in the stream channel resulting from these structures are located fn the fisheries department.

Pictures taken from established photo points in 1987, 1988, 1989, and 1990 as well as other miscellaneous photos of the project are located in the fisheries department.

VEGETATION PHOTO POINT
LOOKING UPSTREAM FROM 180 FT. ON VEG. PLOT LINE
RANDOM ROCKS 2 VICINITY SEPTEMBER 8, 1987

VEGETATION PHOTO POINT
LOOKING UPSTREAM FROM 180 FT. ON VEG. PLOT LINE
RANDOM ROCKS 2 VICINITY AUGUST 30, 1990

VEGETATION PHOTO POINT
LOOKING FROM Ø FT. TO 18Ø FT. ALONG VEG. PLOT LINE
RANDOM ROCKS 2 VICINITY SEPTEMBER 8, 1987

VEGETATION PHOTO POINT
LOOKING FROM 0 FT. TO 180 FT. ALONG VEG. PLOT LINE
RANDOM ROCKS 2 VICINITY AUGUST 30, 1990

RANDOM ROCKS 1

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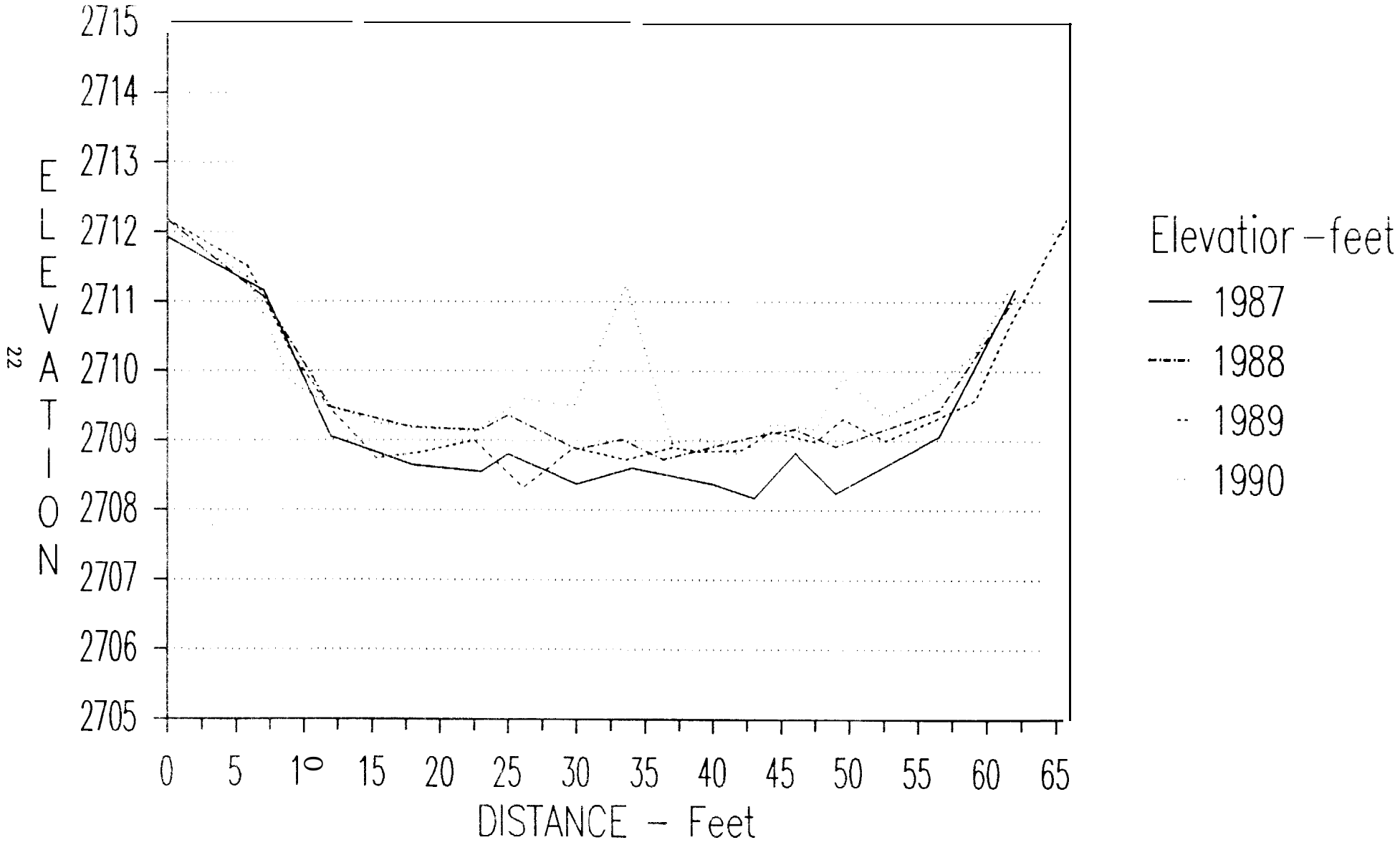

RANDOM ROCKS 1

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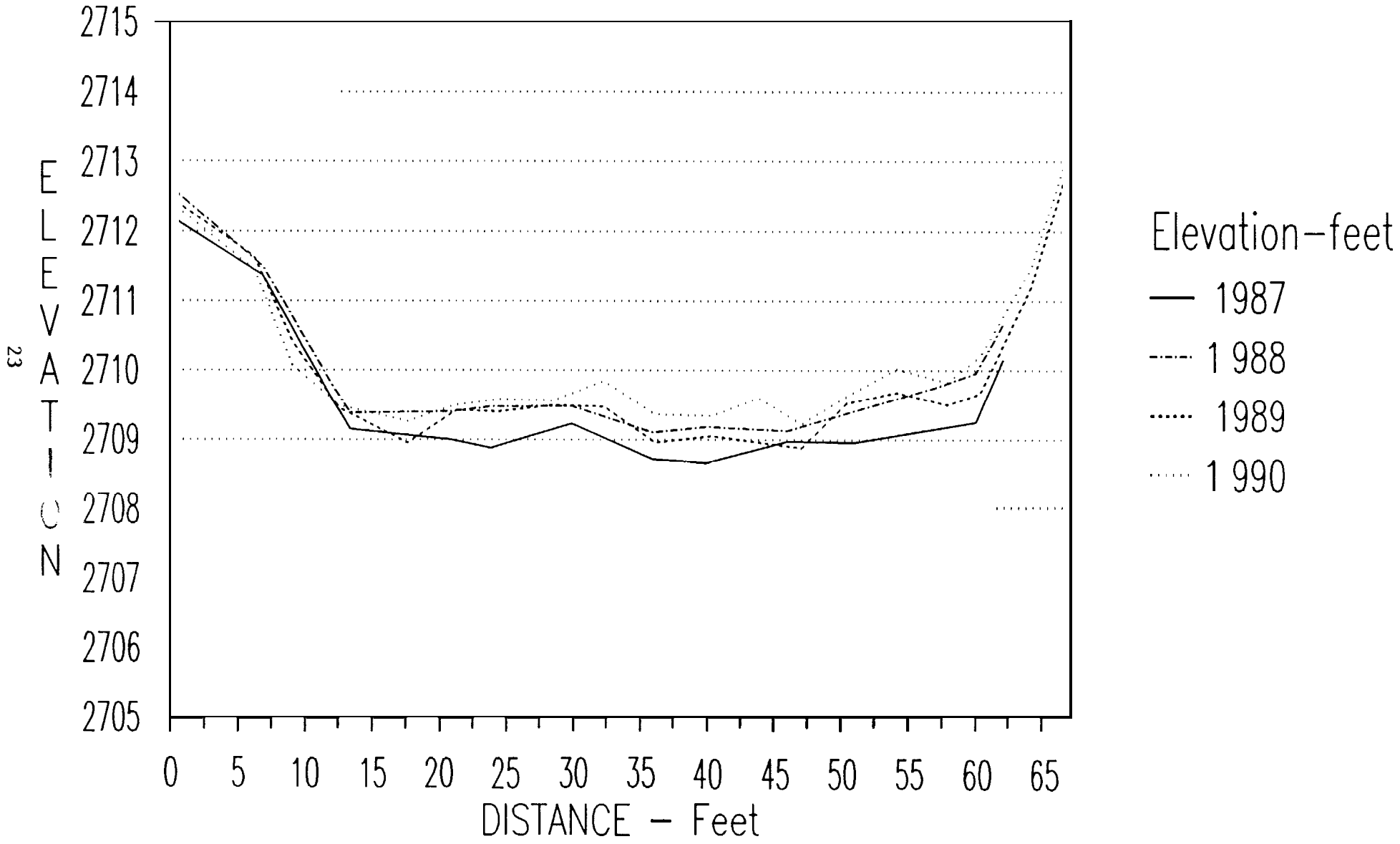

RANDOM ROCKS 1

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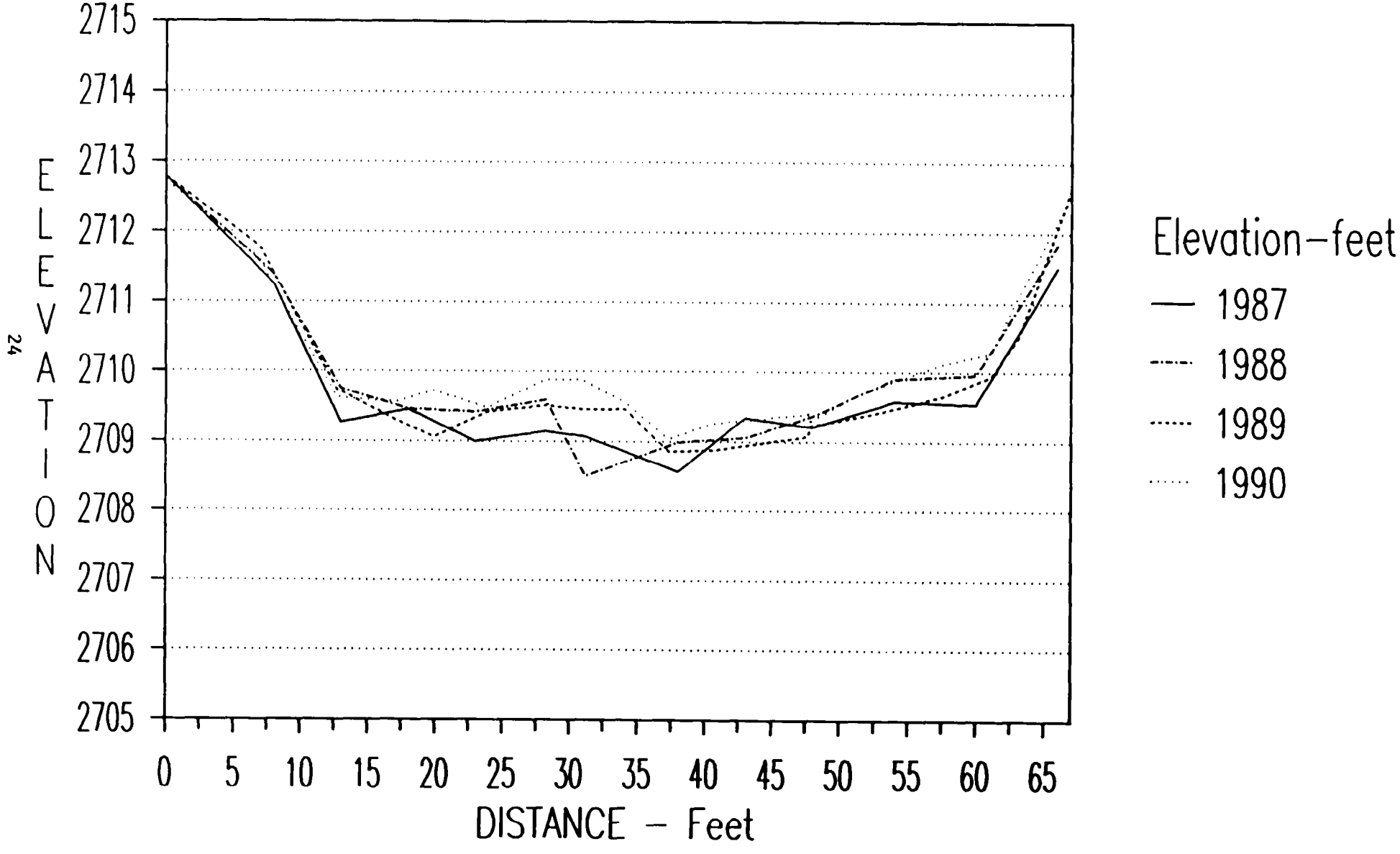

RANDOM ROCKS 1

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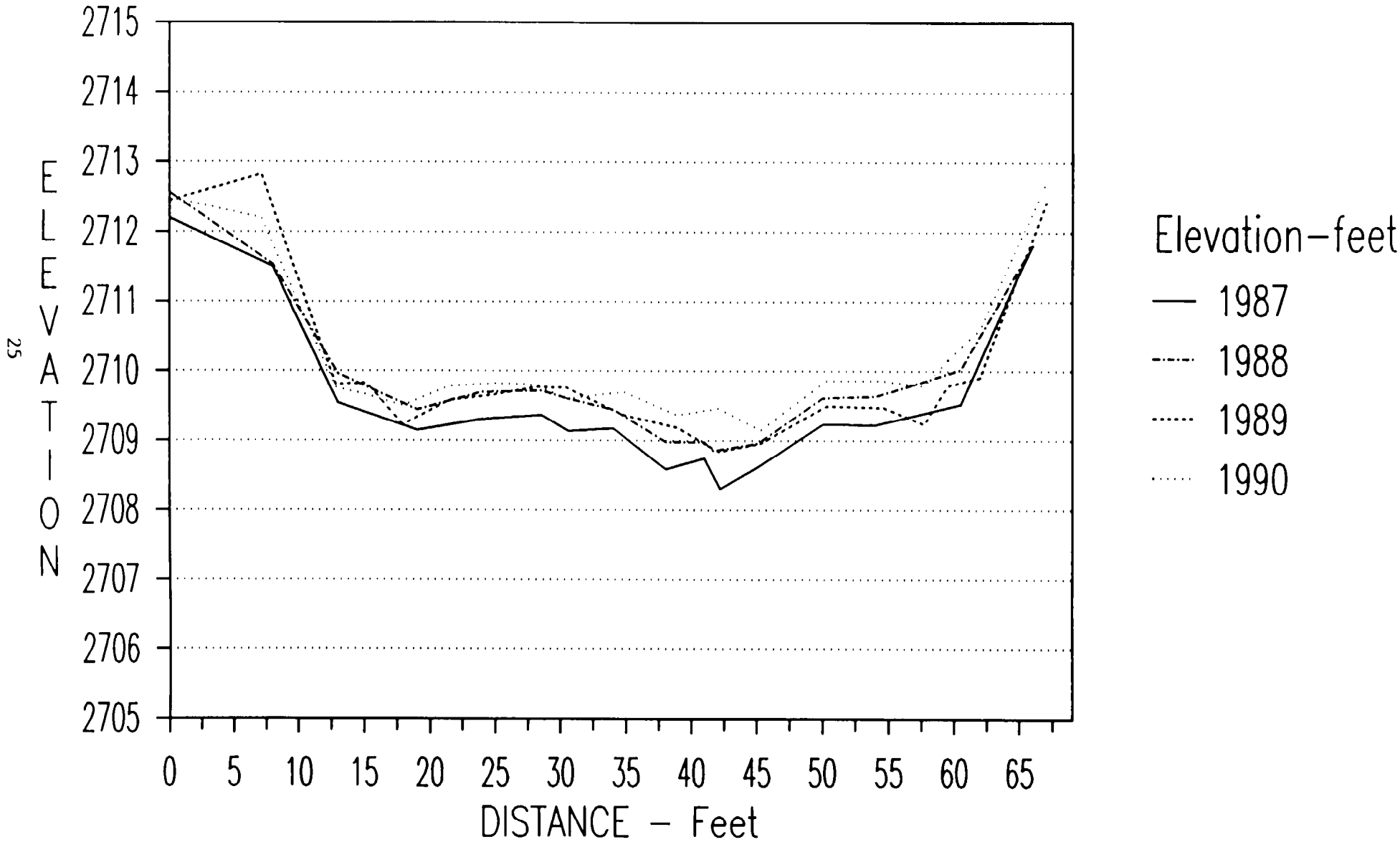

RANDOM ROCKS 1

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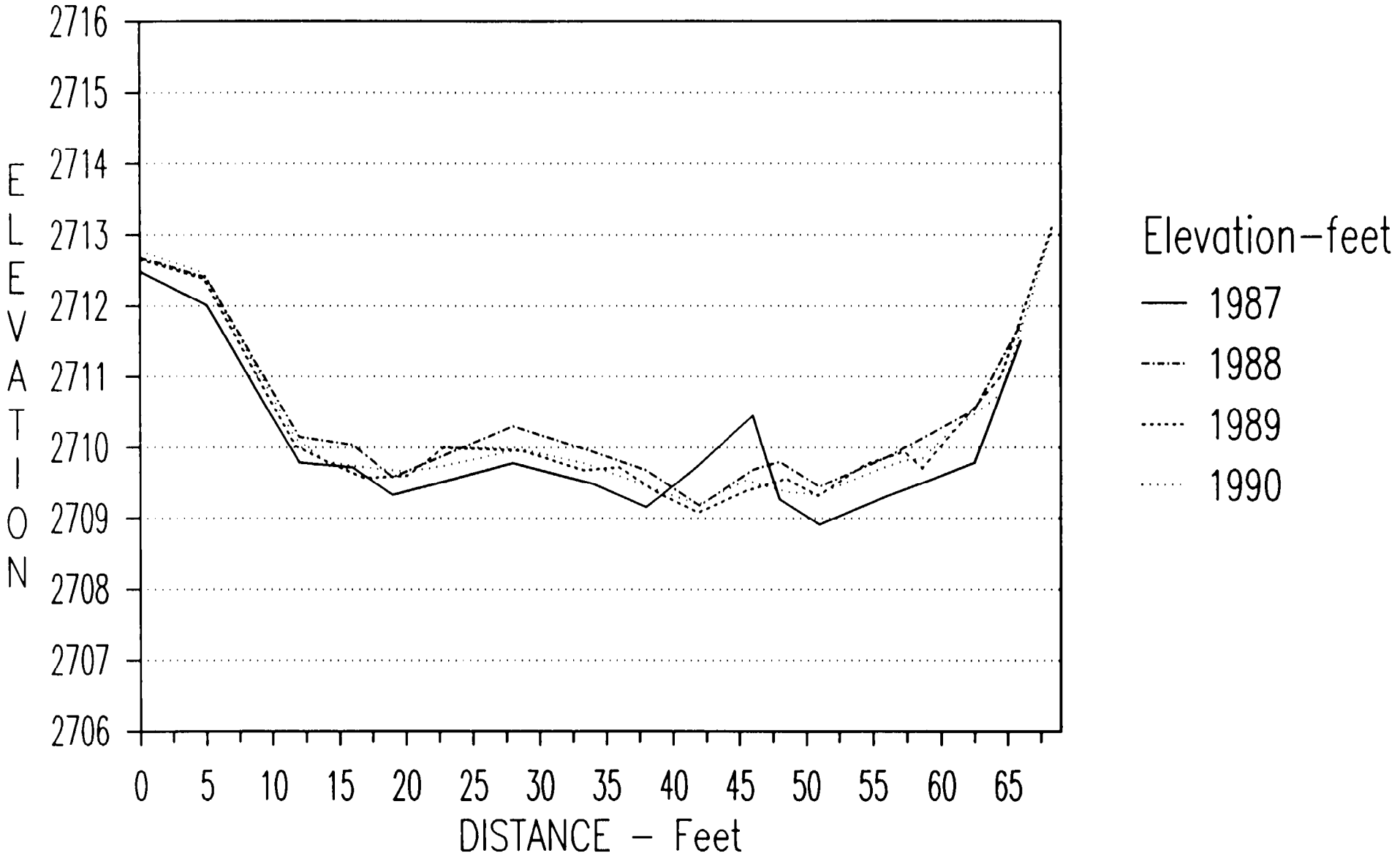

LOG SILLS

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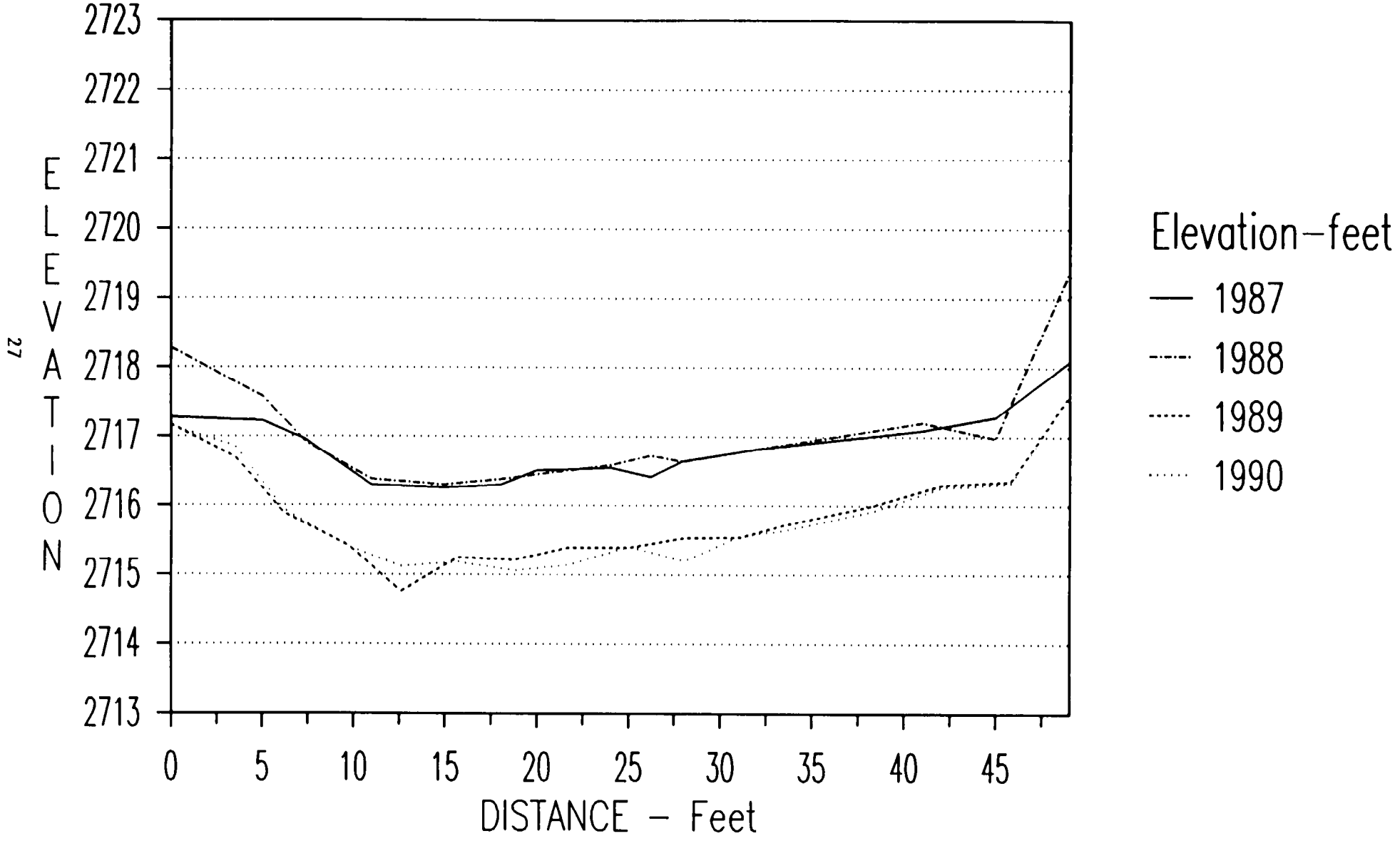

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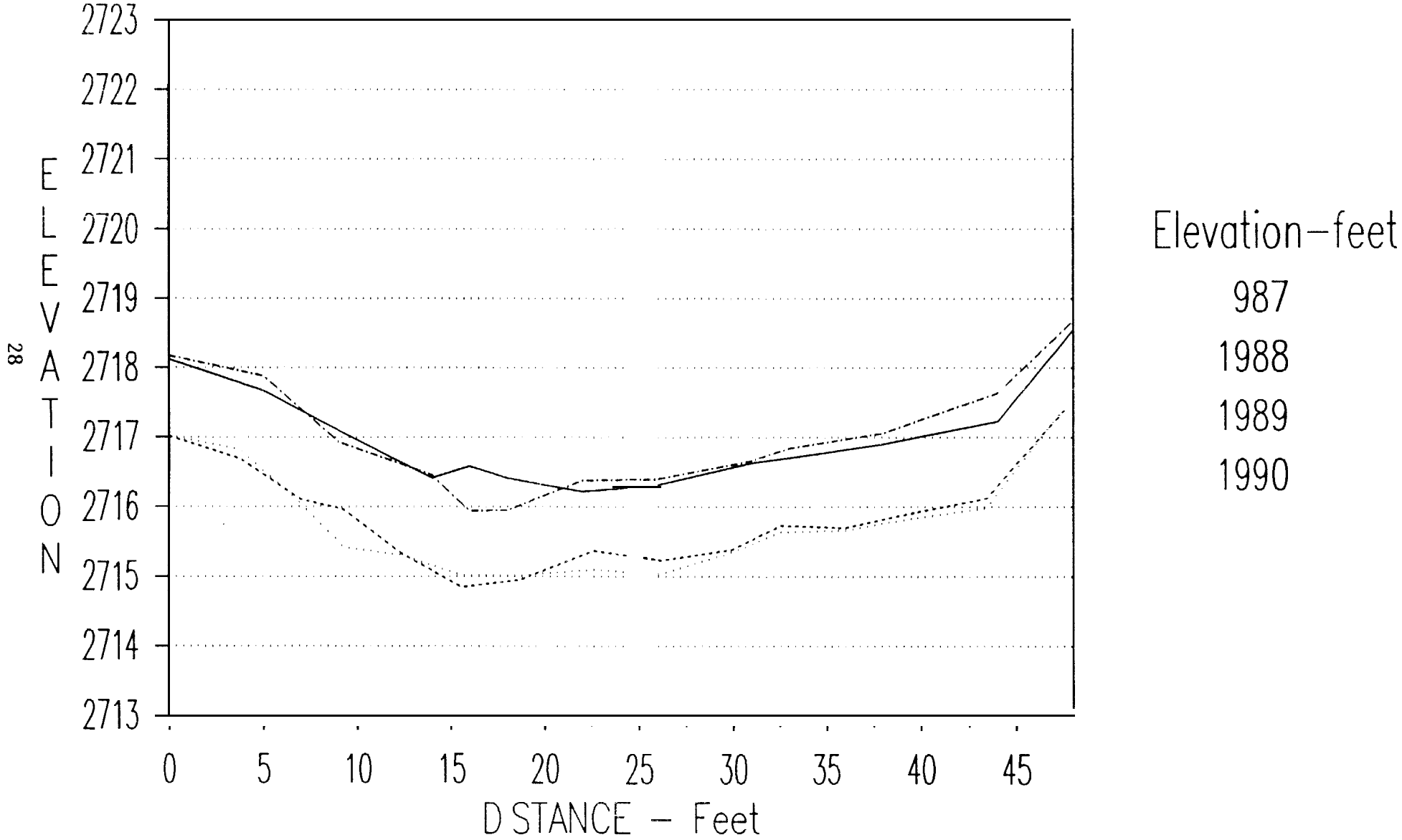

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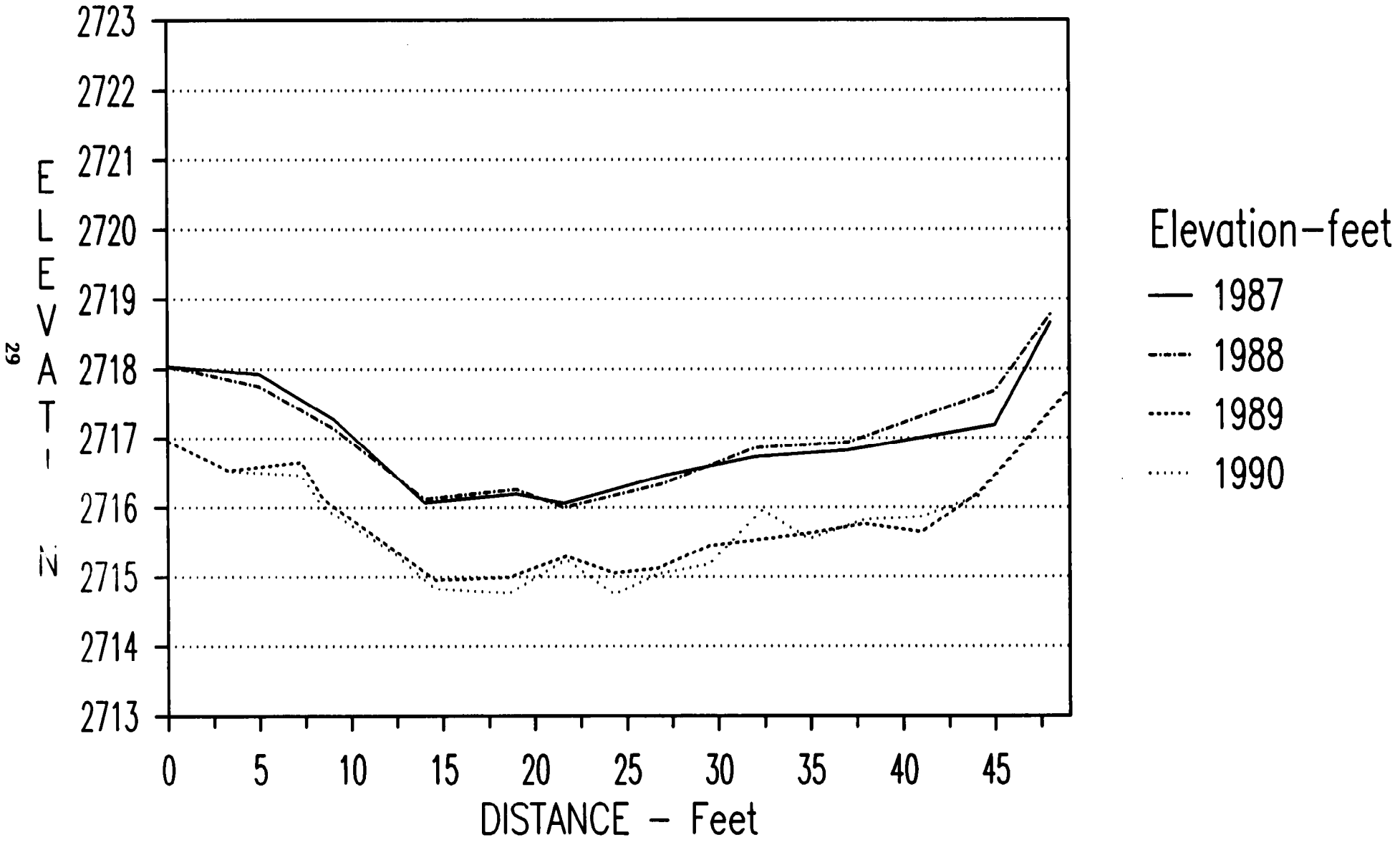

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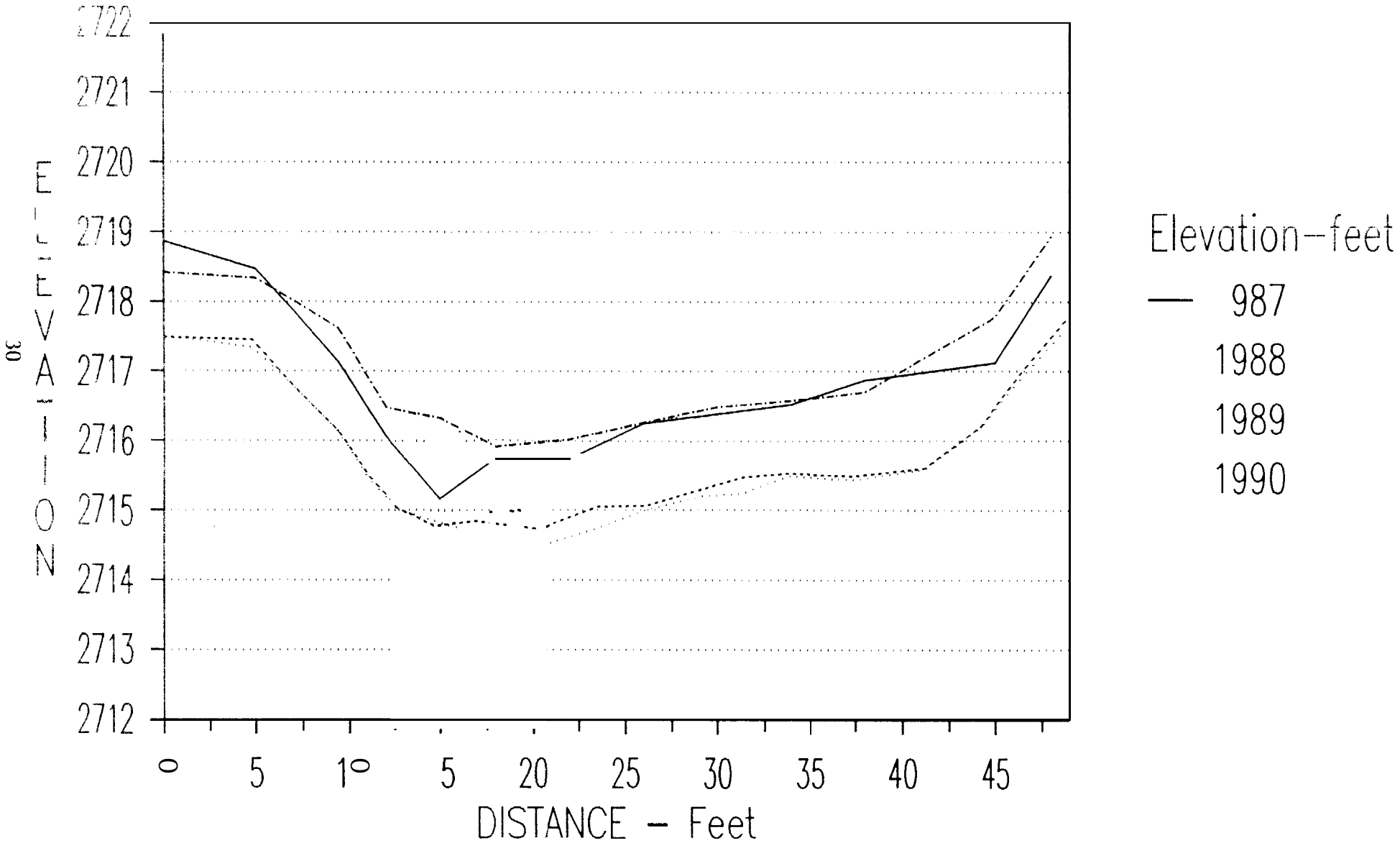

LOG SILLS

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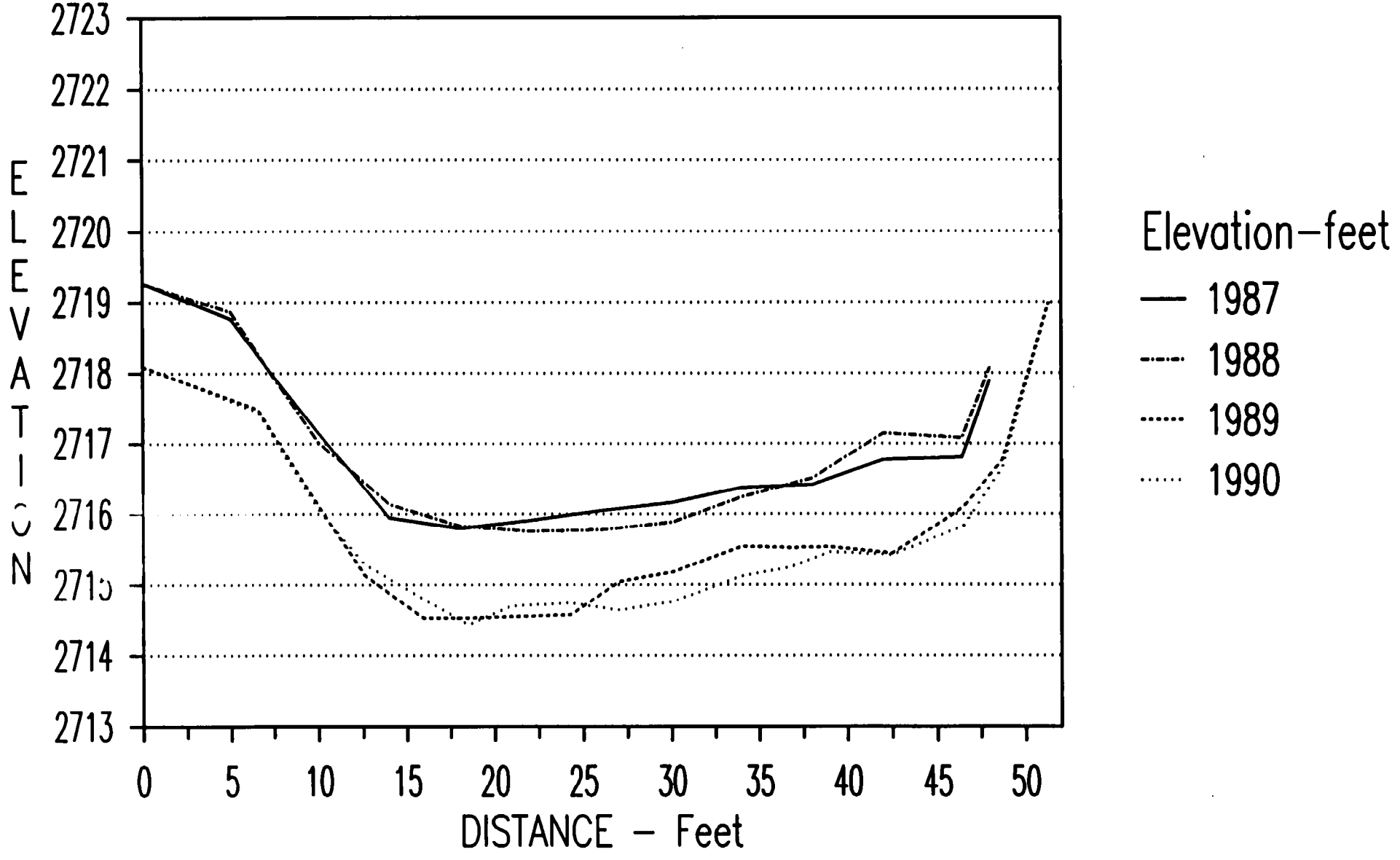

RANDOM ROCKS 2

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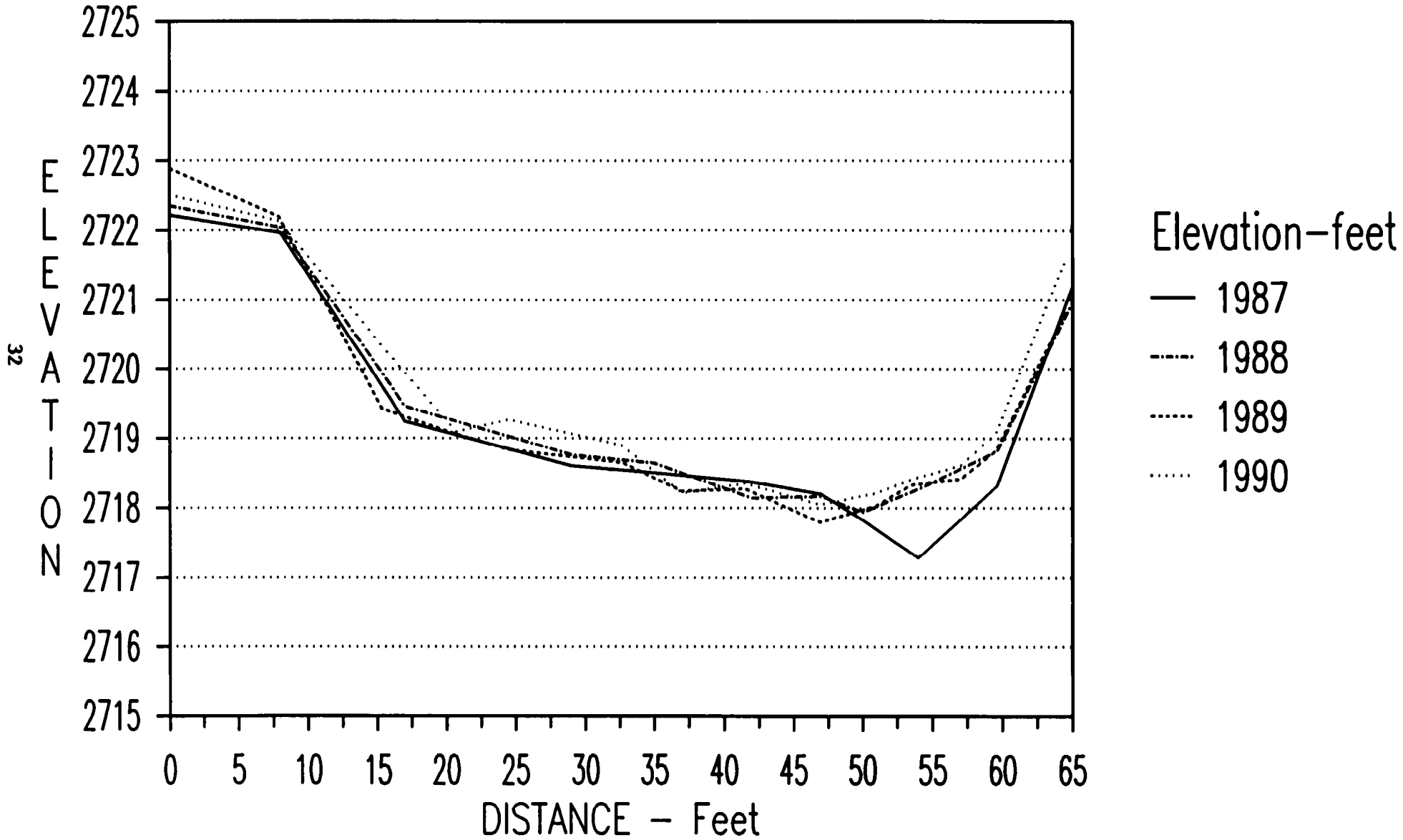

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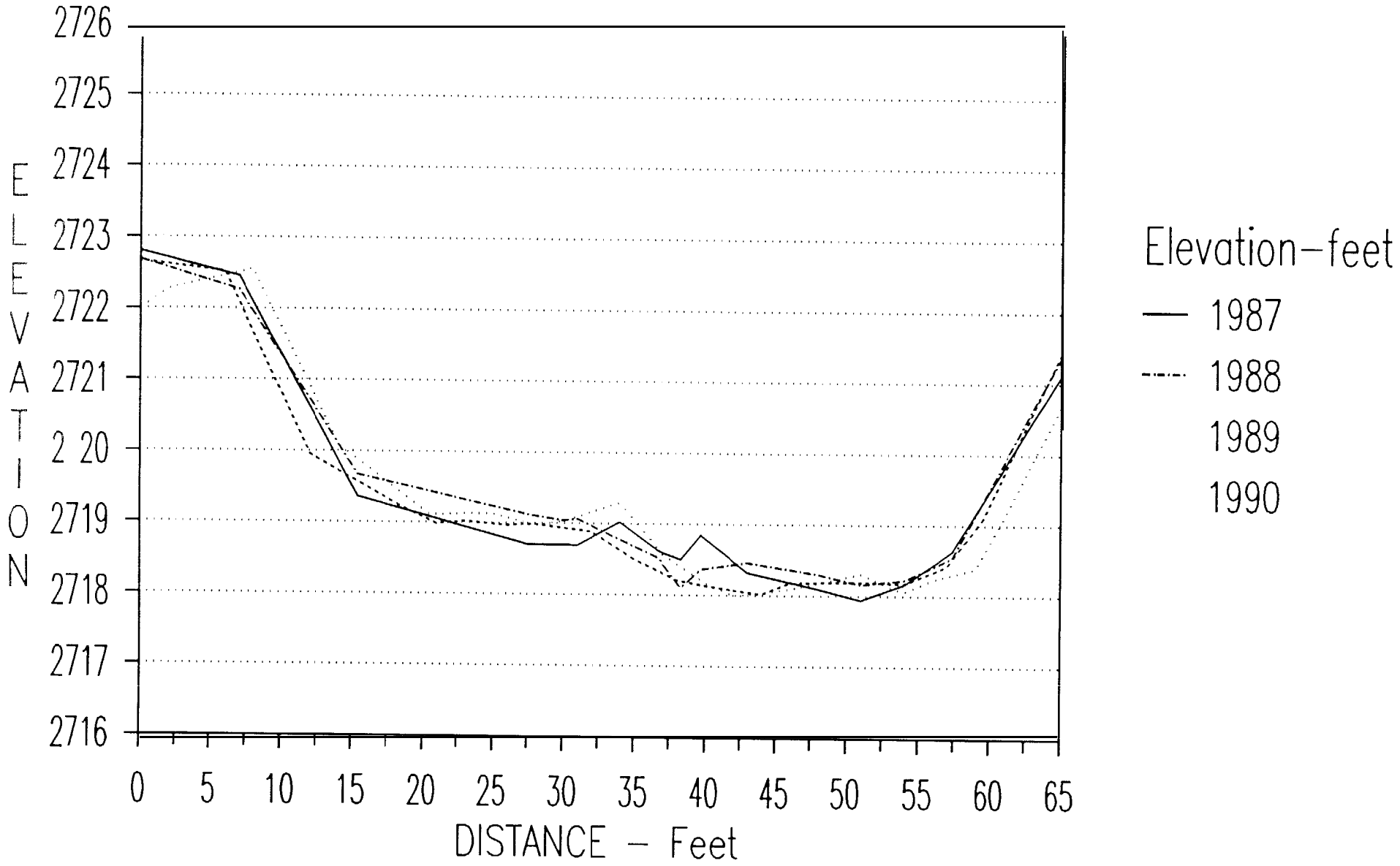

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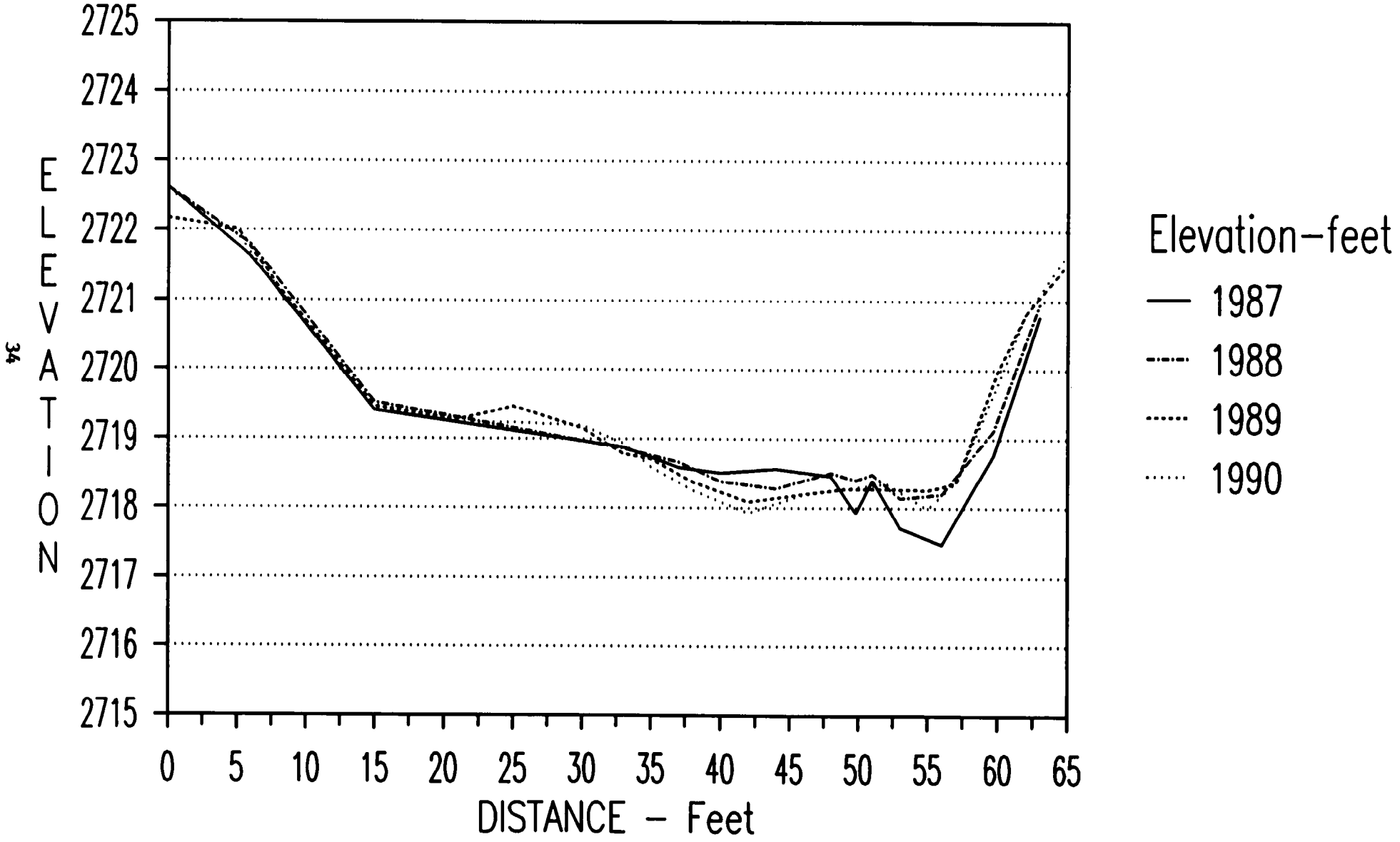

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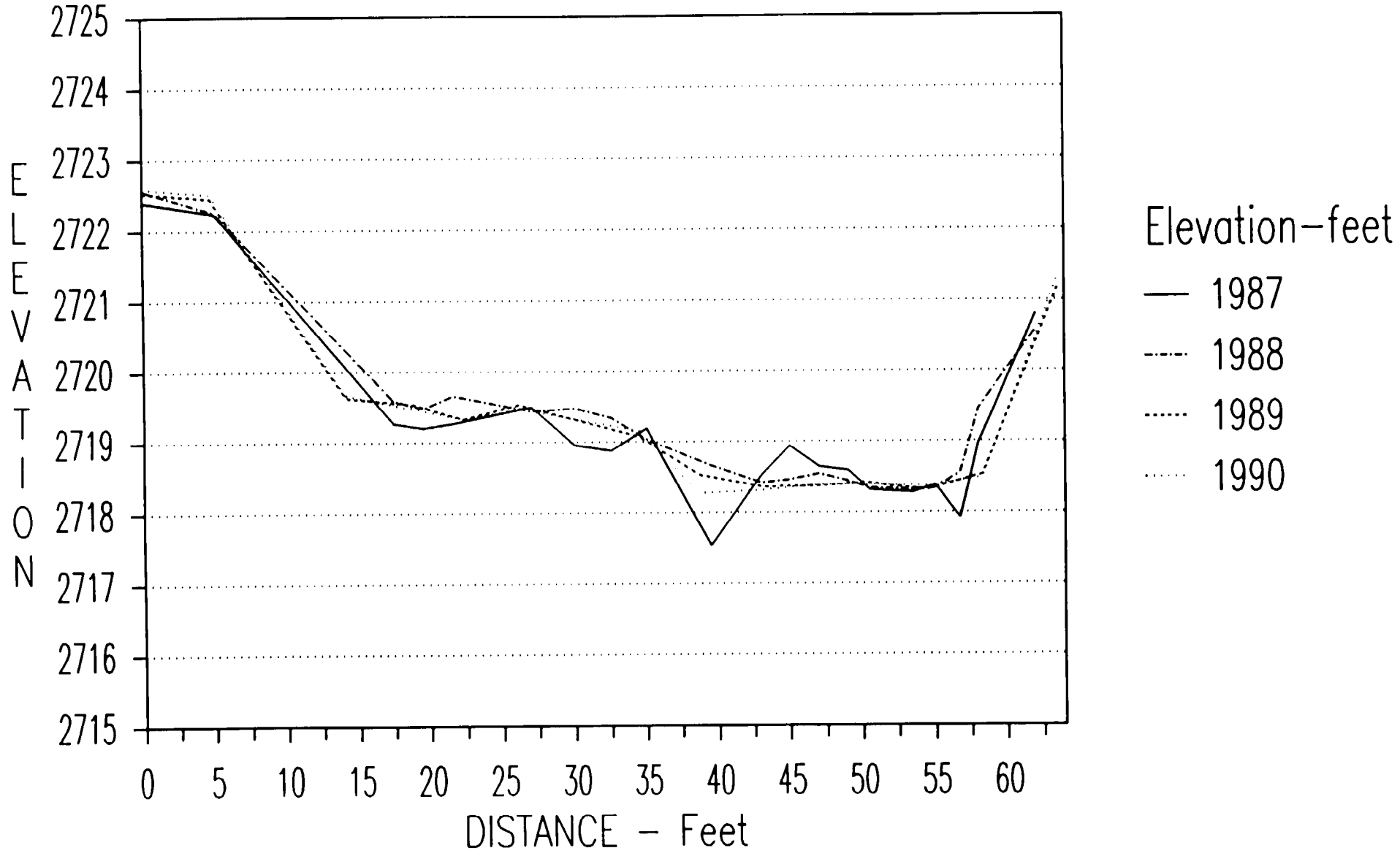

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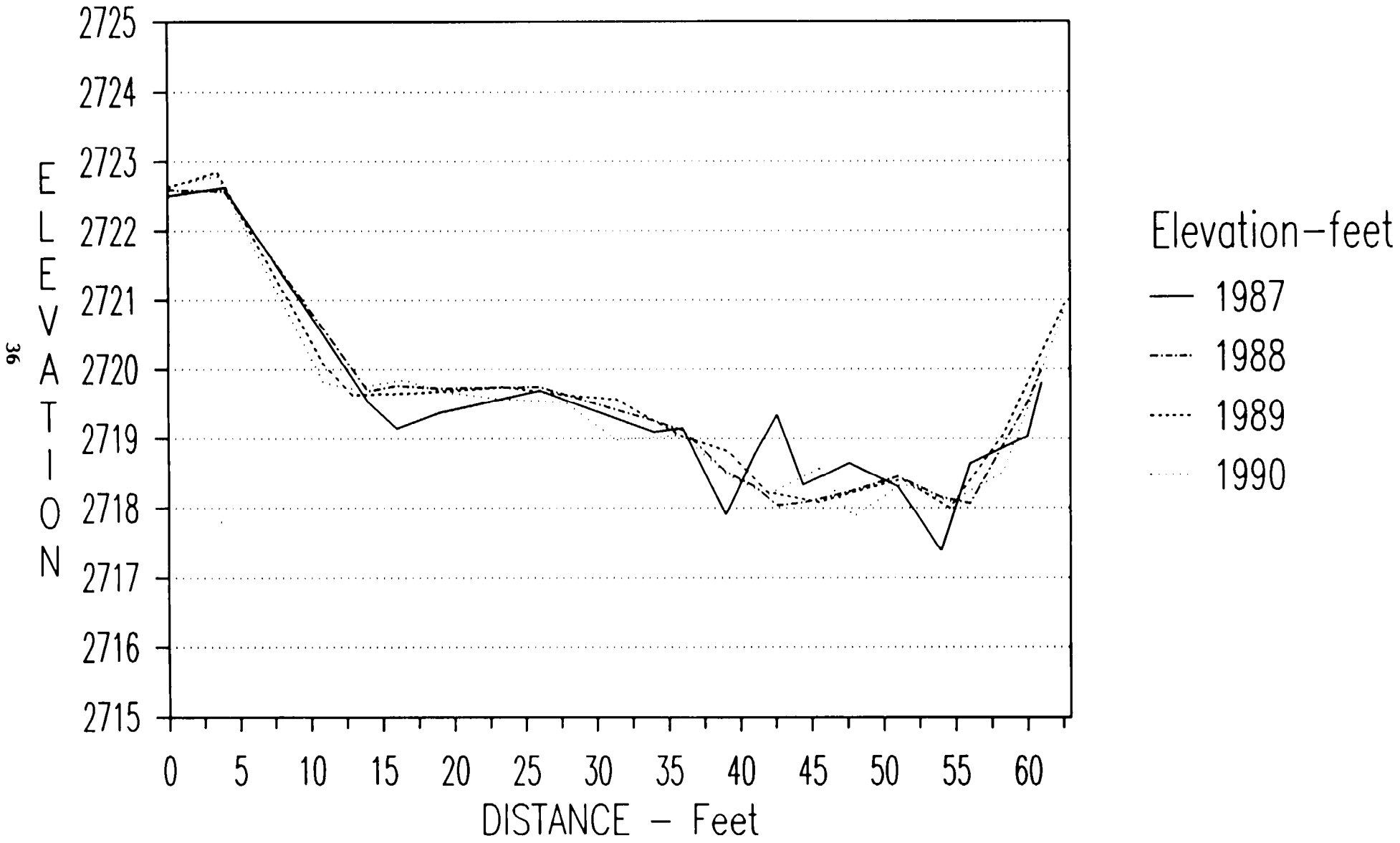

ROCK TRIOS

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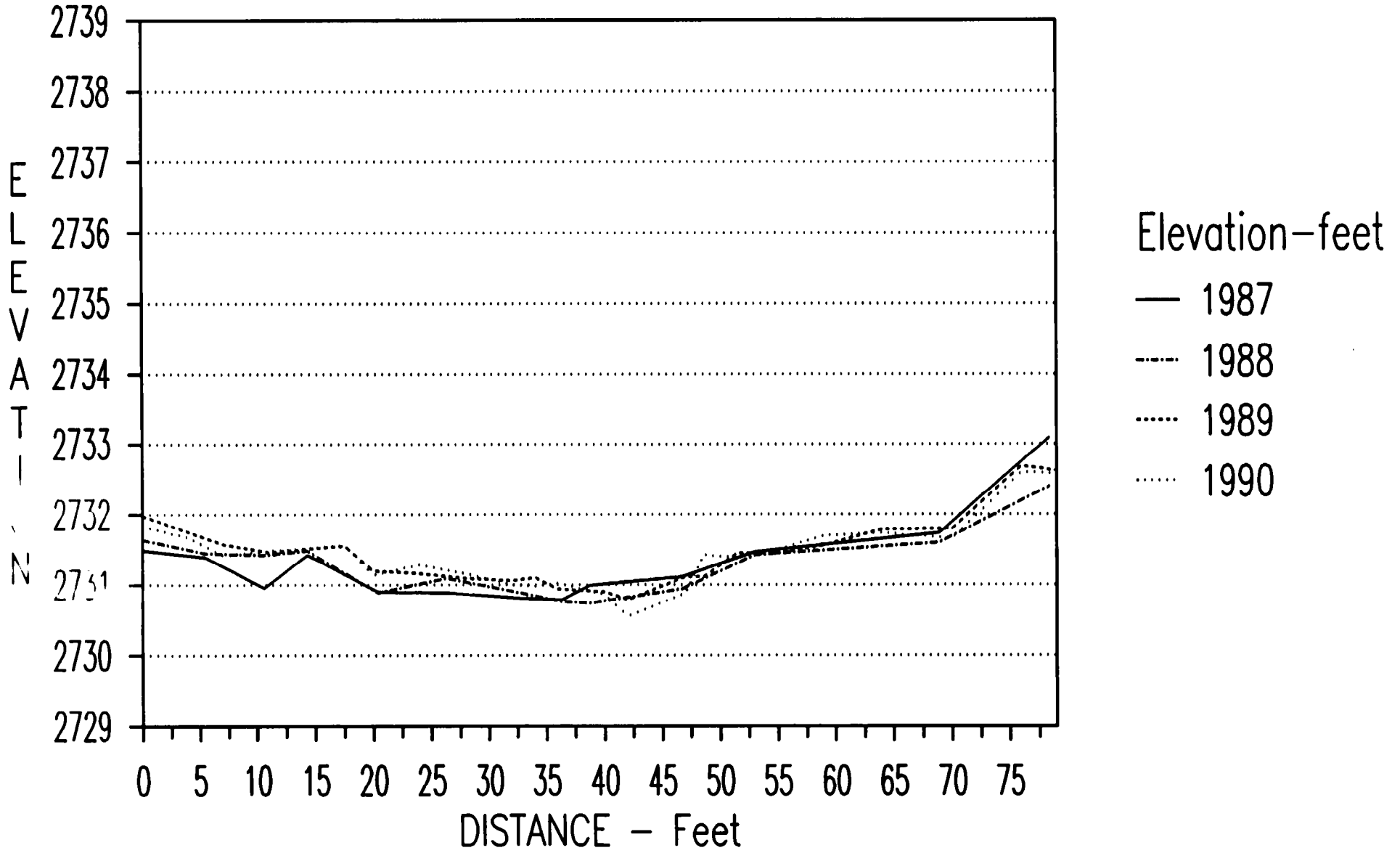

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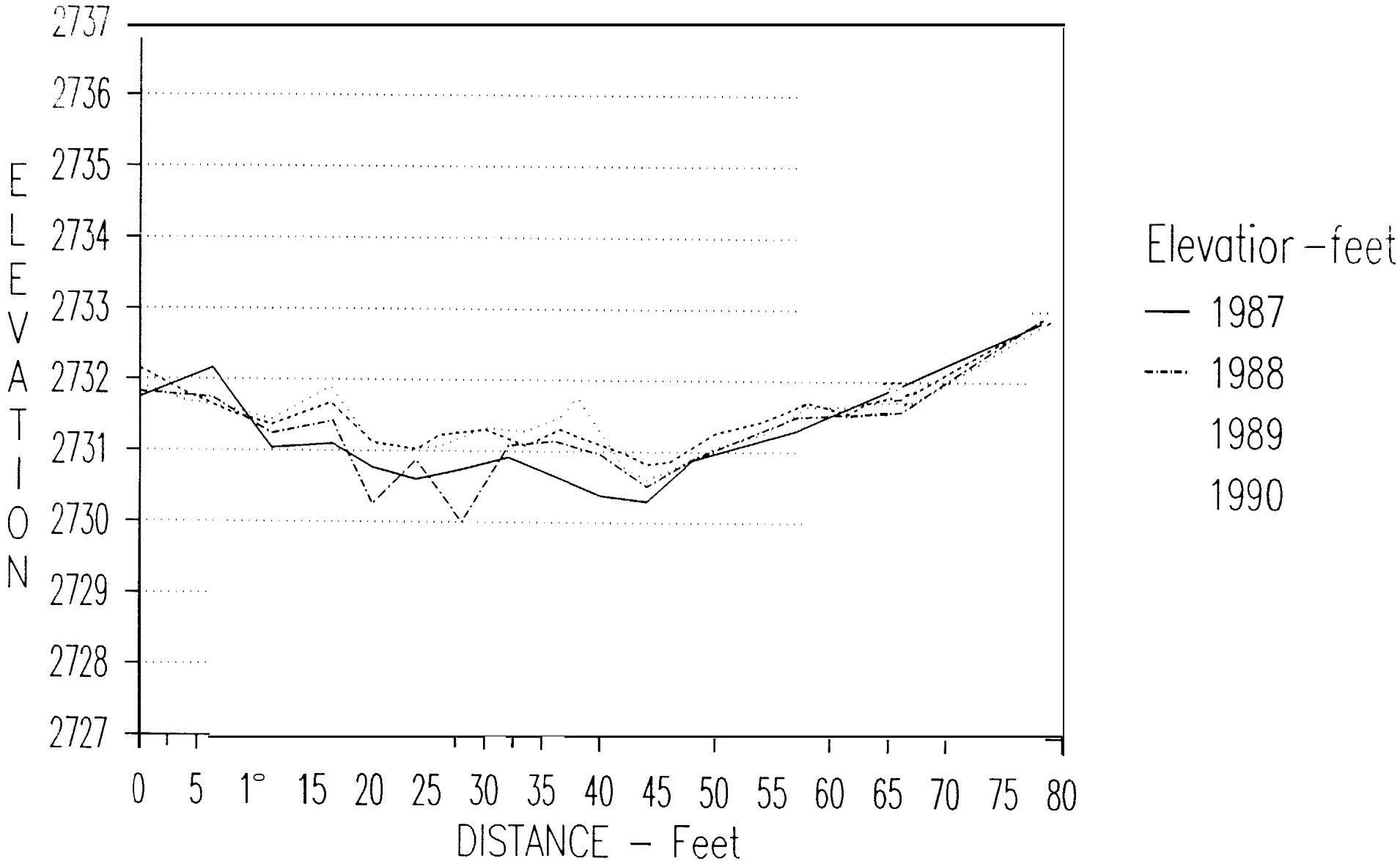

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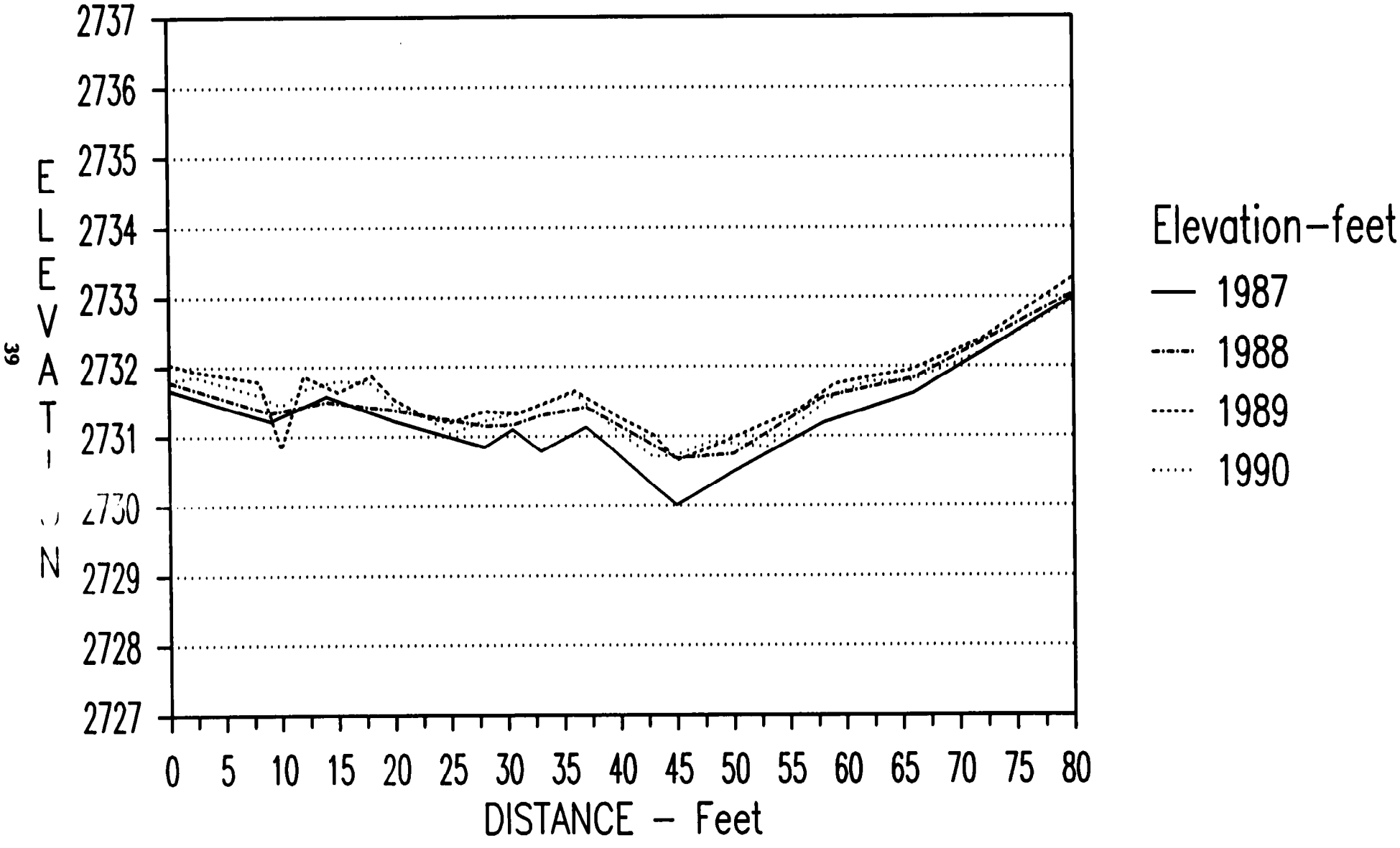

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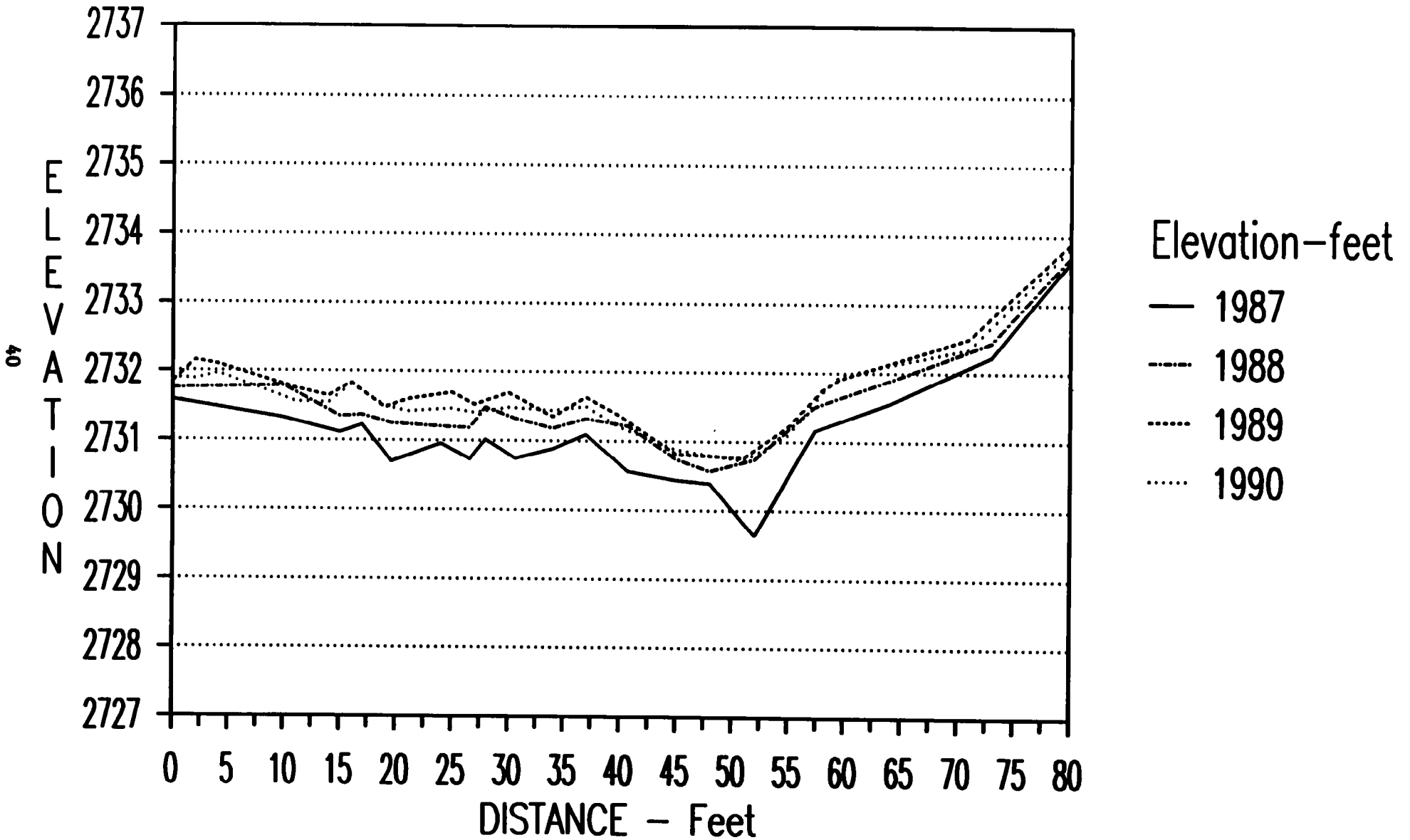

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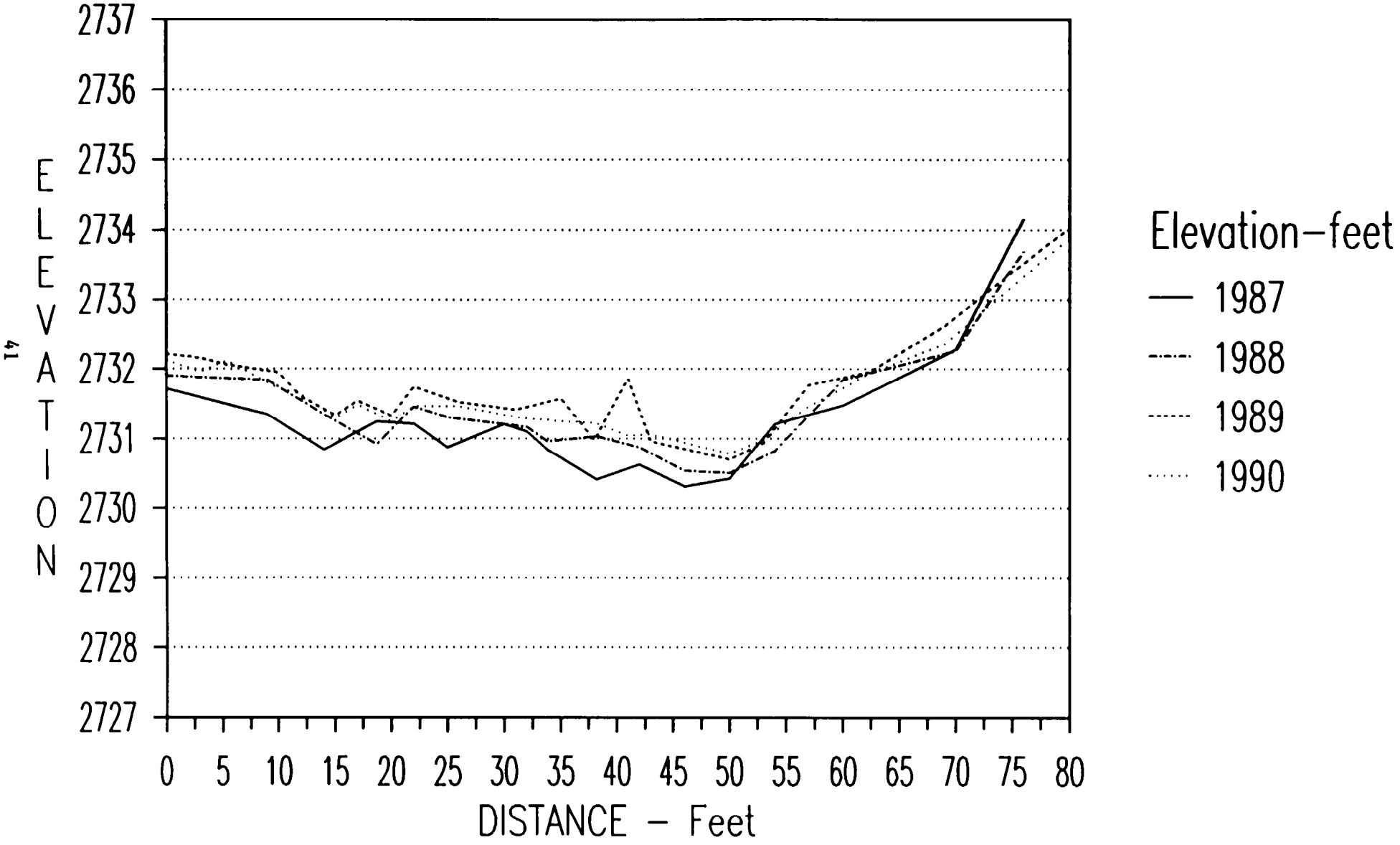

ROCK WEIR 3

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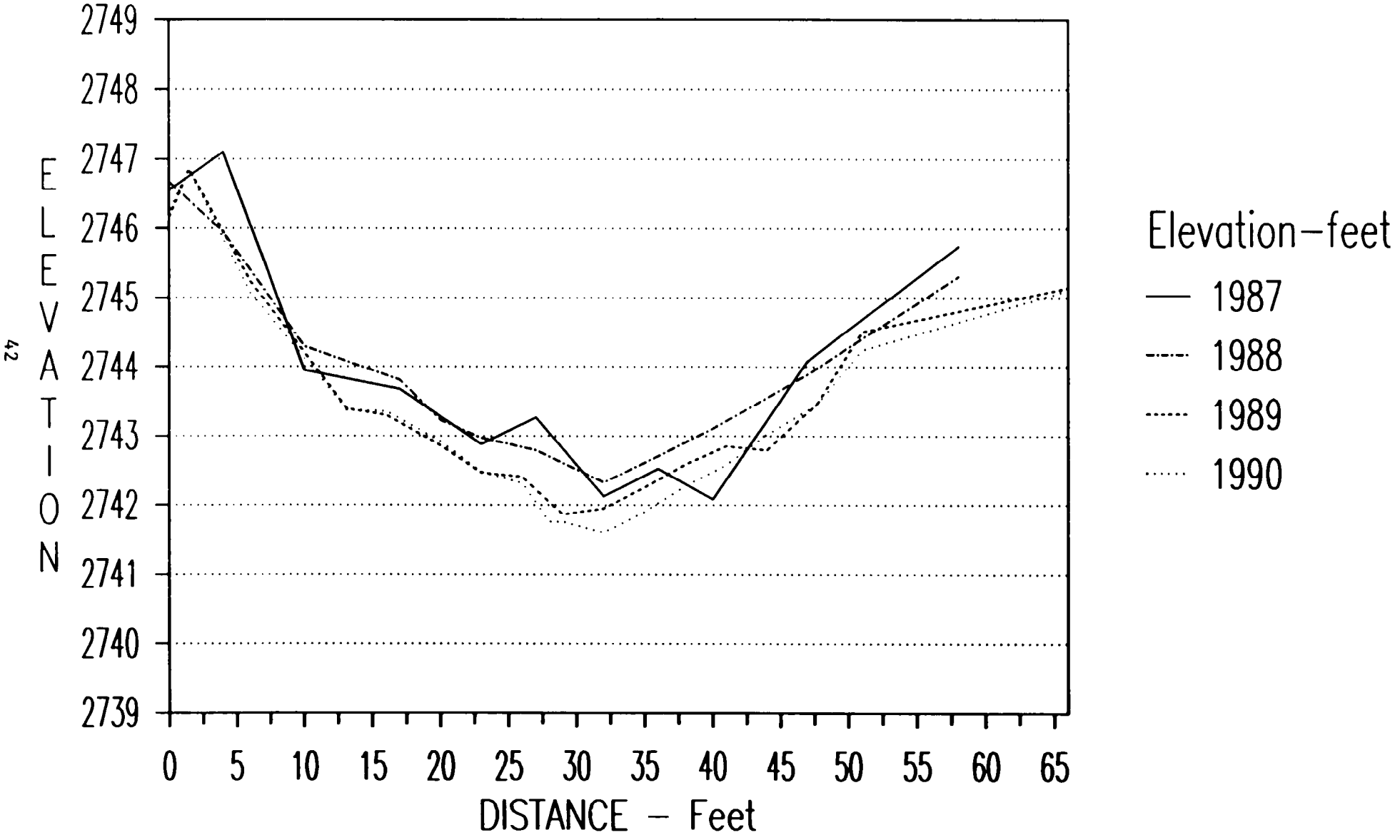

ROCK WEIR 3

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ROCK WEIR 3

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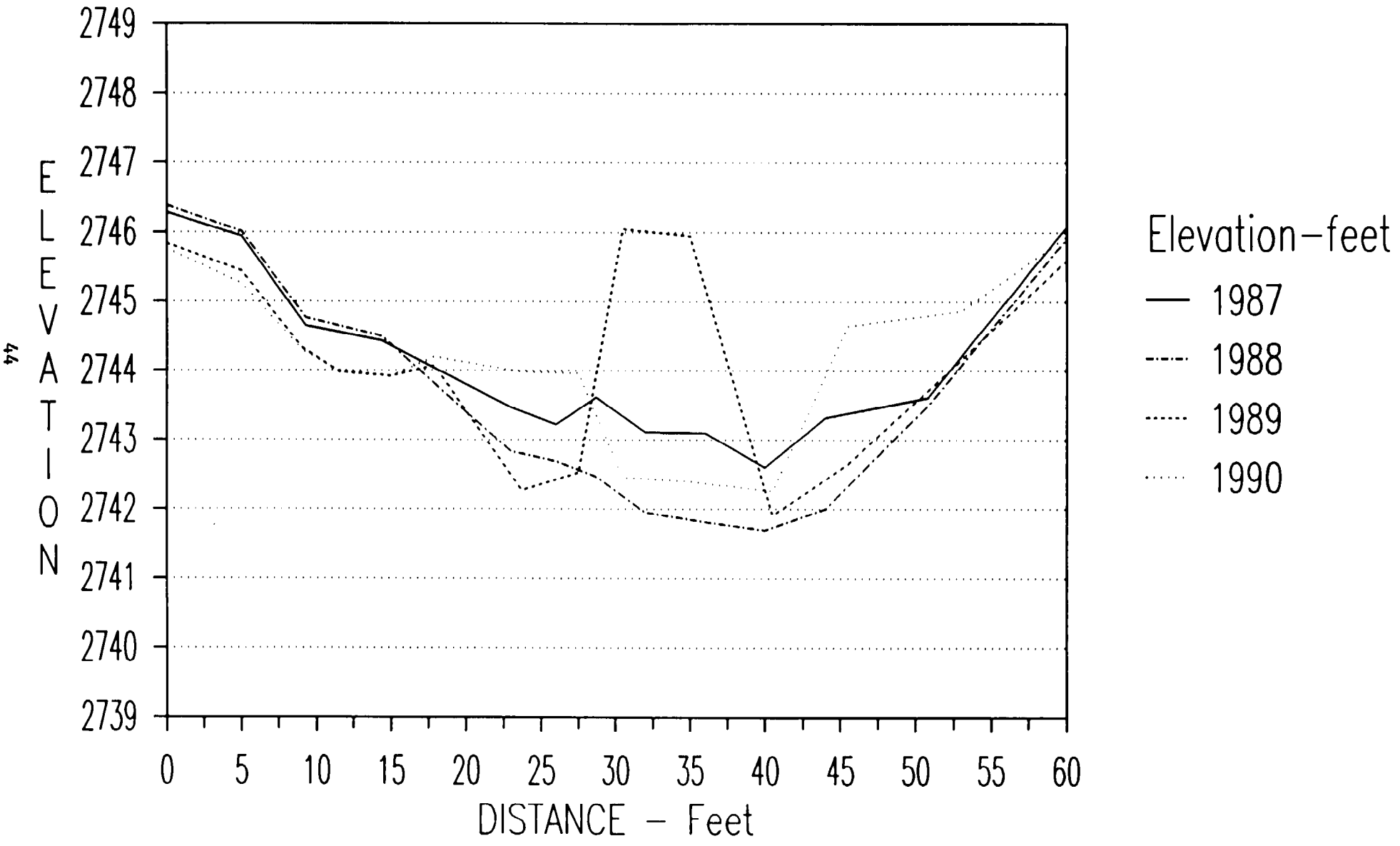

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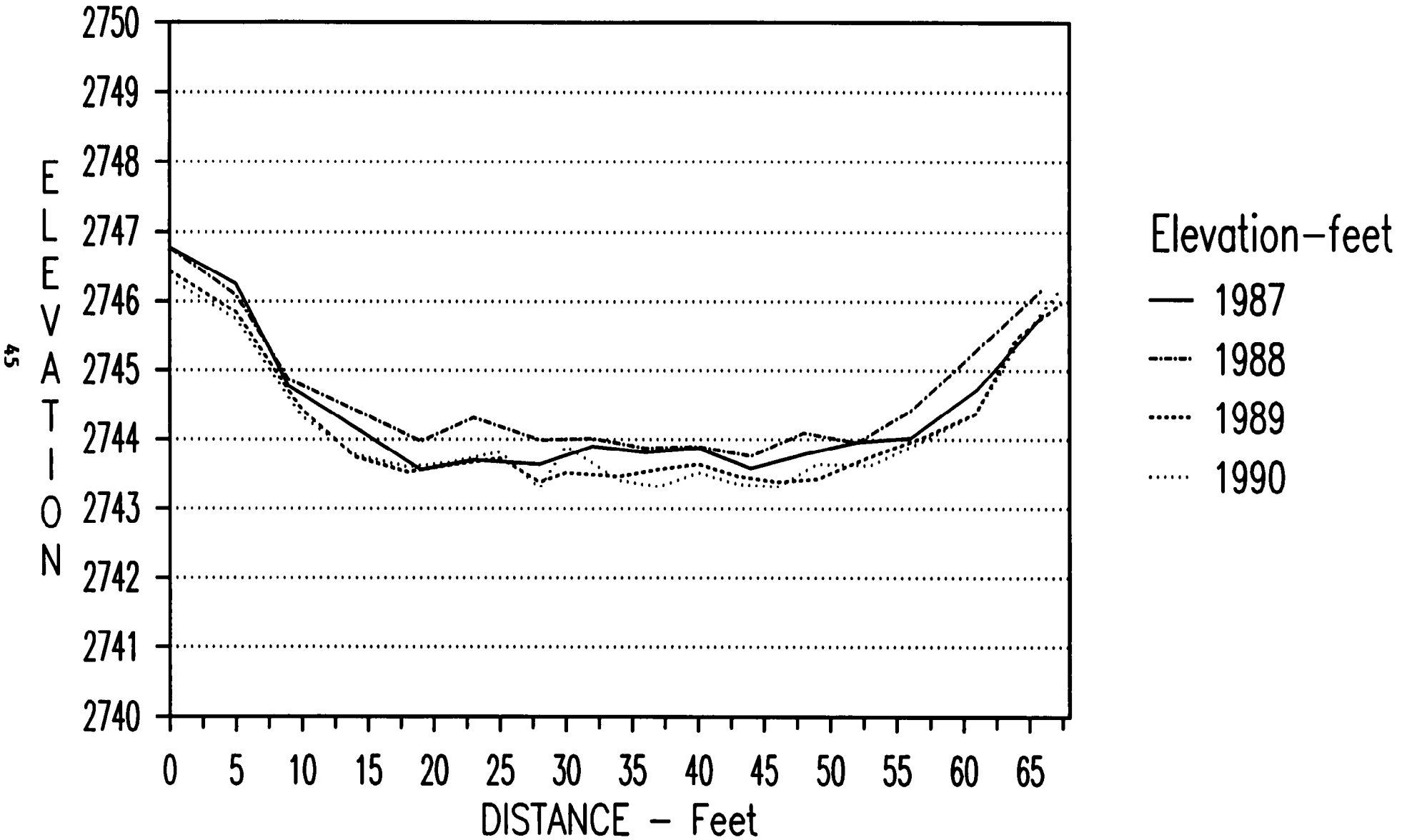

ROCK WEIR 3

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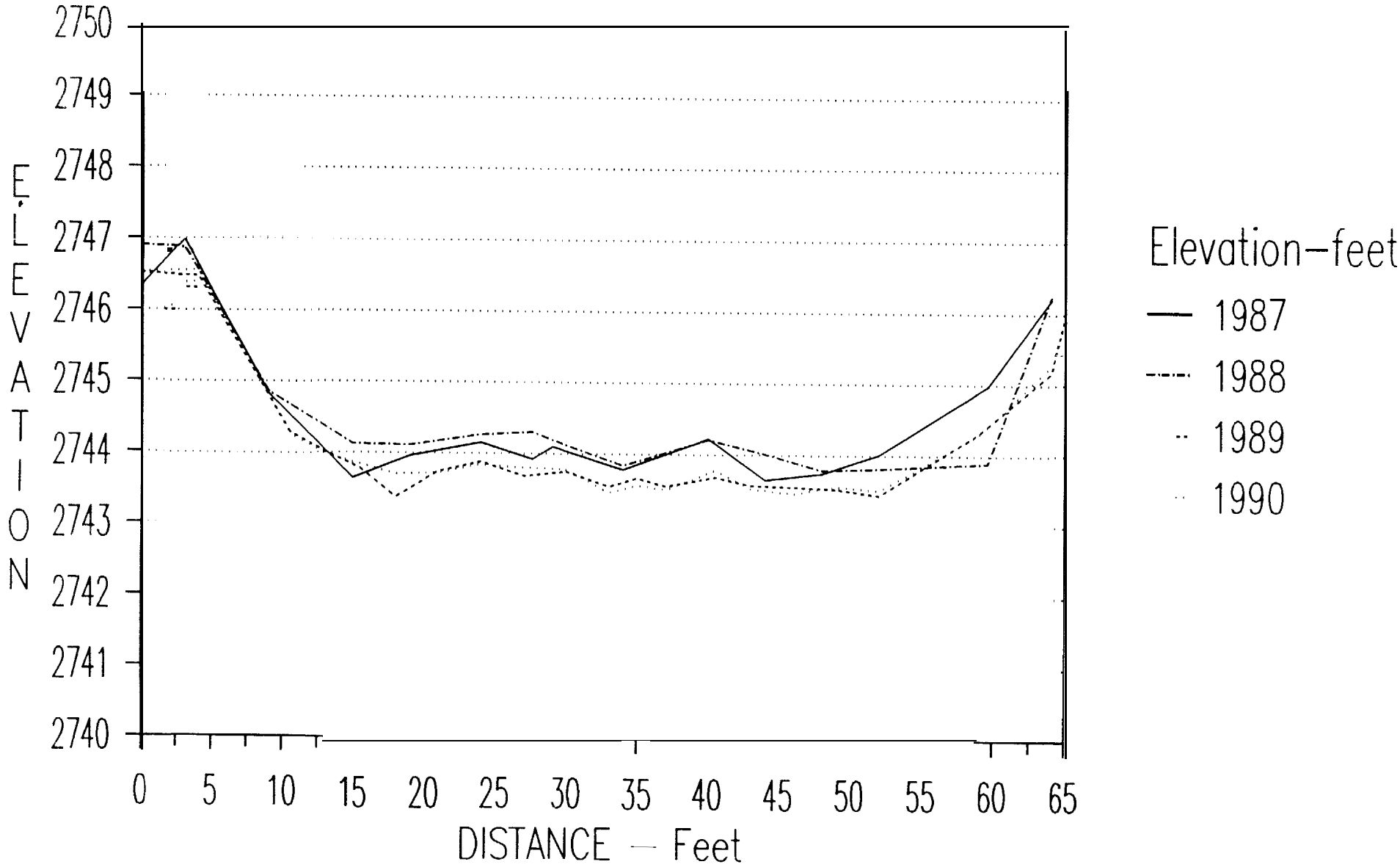

LITTLE NACHES RIVER PASSAGE PROJECT

Annual Report FY89

Prepared by

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Project No. 86-75

Contract Number DE-AI79-86BP60266

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ABSTRACT

As part of the implementation of section 704d(l) of the Northwest Power Planning Council's Fish and Wildlife Program, the USDA Forest Service received funding from the Bonneville Power Administration to improve passage for anadromous salmonids on the Little Naches River, tributary to the Naches, Yakima, and Columbia Rivers. The project's goal was to provide anadromous salmonid access to an additional 24 miles of stream habitat in the Little Naches River and its tributaries. The target species for this project are chinook salmon (Oncorhvnchus tshawytscha), steelhead trout (Oncorhynchus mykiss), and coho salmon (Oncorhynchus kisutch).

The project was divided into two subprojects. The first consisted of the construction and maintenance of a concrete fishway to allow anadrornous salmonid passage at Salmon Falls. The second sub-project rehabilitated the stream channel below Salmon Falls to permit fish migration to the Falls year round.

Both subprojects were completed in 1987, essentially on budget. This report documents the monitoring and maintenance work performed to date.

The fishway and instream structures installed at the rehabilitation site appear to be functioning as planned. Chinook salmon redds were found in the Little Naches River above Salmon Falls in 1988 and 1989.

Riparian vegetation in the floodplain of the rehabilitated river section appears to be increasing.

Maintenance activities on the stream rehabilitation structures were determined not to be necessary during the 1989 season.

INTRODUCTION

As part of the implementation of section 704d(l) of the Northwest Power Planning Council's Fish and Wildlife Program, the USDA Forest Service (USFS) received funding from the Bonneville Power Administration (BPA) to improve passage for anadromous salmonids on the Little Naches River, tributary to the Naches, Yakima, and Columbia Rivers. In 1987,under contract (Agreement DE-AI79-86BP60266, Project 86-75) with BPA the USFS completed a project to improve fish passage so that anadromous salmonids could access approximately 24 stream miles of habitat in the upper portions of the Little Naches River. The target species for this project were chinook salmon (Oncorhynchus tshawytscha), steelhead trout (Oncorhynchus mykiss), and coho salmon (Oncorhynchus kisutch).

The project was divided into two sub-projects. The first consisted of the construction of a concrete fishway to allow anadromous salmonid passage at Salmon Falls (River Mile 4.4). The second sub-project rehabilitated the stream channel below Salmon Falls (River Mile 3.2-4.3) to permit summer low flow fish migration to the Falls. Both sub-projects were completed in 1987. This report describes the monitoring and maintenance activities to date.

DESCRIPTION OF STUDY AREA

Around 1965, the Washington Department of Fisheries attempted to provide fish passage over Salmon Falls by using explosives to excavate a crude, shallow channel around the right side (looking downstream) of the falls. This effort was partially successful since small numbers of adult salmon were observed spawning above the falls during the later 1960's. However, several major floods in the 1970's damaged the channel which resulted in its collapse and filling in with rock debris.

The same floods that rendered the passage channel in-operable, also severely damaged the channel downstream between the Falls and Crow Creek by widening the river bed and depositing large amounts of gravel, sand and rubble. Subsequently, the USFS performed an emergency flood rehabilitation project and removed most of the accumulated bedload. This work was done to protect the nearby road and a campground from future flood damage and to provide surface flow during the summer months (prior to bedload removal, most summer flow was subsurface). The river was still too wide and shallow to permit satisfactory adult anadromous fish passage during low flows, the channel was still unstable, and riparian vegetation was not re-established. After the floods of the 1970's and before the 1987 construction no salmon had been observed spawning above the mouth of Quartz Creek, apparently due to this habitat damage and passage problem.

This two-part rehabilitation project was completed in 1987 and is estimated to provide access to 17 stream miles (51 acres) of chinook salmon habitat, 19 stream miles (53 acres) of coho salmon habitat, and 24 stream miles (67 acres) of steelhead trout habitat. Annual anadromous salmonid production potential is estimated to be 29,500 chinook smolts, 35,500 coho smolts, and 6,500 steelhead trout smolts. Spawning chinook salmon have been observed above the Falls each year since the rehabilitation project was completed.

RESULTS AND DISCUSSION

Sub-project I- Salmon Falls Fishway

The fishway was drained on August 1st and examined for bedload accumulation and wear. The structure appears to be functioning well and no major maintenance problems were noted. Several weir orifices were blocked when gravel backed up against waterlogged debris, all but one of the orifices were unplugged within 4 hours after the fishway was drained, One of the weir orifices was not unplugged when the fishway was drained. After consultation with Washington Department of Fisheries biologists at the site, it was agreed that the fishway should not remain dewatered overnight just to unplug one orifice.

A gravel bar has formed just upstream of the fishway since it was completed in November 1987. The bar is not creating any passage problems, but it is indicative of the bedload moving through or being deposited in the fishladder. It has been suggested that the fishway exit be blocked during high flows in an effort to direct more of the bedload over the falls and allow less into the fishway, The fishway exit will be boarded this winter to test this hypothesis.

In 1988, five chinook salmon redds were located upstream of Salmon Falls fishway and thiry-six redds were located downstream in the Little Naches River. This year, nine chinook salmon redds were marked upstream of Salmon Falls and forty-four redds were located downstream.

On Tuesday, September 5, 1989, a female chinook salmon was observed attempting to pass the fish ladder. It had no problem passing the first three weirs of the ladder by jumping over them. The fourth weir had no water flowing over the top. The fish made several attempts to swim through the orifice, but was unable to make it. It also attempted to jump the dry wall at a point which was four to five feet above the water surface, but didn t clear the wail. It continued to make another five or six runs up to the wall, rising partially out of the water but not completing the attempted jumps, After these attempts, it appeared to rest at the downstream end of the pool and, at one point, was swept over the third weir. It immediately jumped back into the weir three pool and again made several more unsuccessful attempts to swim through the fourth weir orifice.

Sub-project II-Channel Rehabilitation

The channel rehabilitation structures were re-examined this summer and some of them have been damaged by high flows. The stream has undercut one leg of each of the two downstream-most log V-weirs. Four rock V-weirs have rocks that rolled out of place. However, it appears that the structures have functioned as designed and maintained summer low flow fish passage in the channel immediately downstream from the Salmon Falls. Other than appearance, there does not appear to be any pressing need to repair the instream structures. The structures will continue to be monitored and if needed to maintain fish passage, will be repaired.

Stream channel cross-sections were established in 1987 to monitor the effects of the instream structures. Sets of 5 transects spaced 10 feet apart were set up for the upstream-most log weir, 2 random rock sections, a rock trio grouping, and a rock weir. Elevations were measured to the nearest tenth of foot. Graphs of the transect data collected in 1987, 1988, and 1989 are attached to this report.

1) LOG SILL- The channel cross sections appear unchanged over the last two years. The 1989 elevations are approximately a foot lower than the 1988 and 1987 elevations. This is most likely an error in the field notes, as this portion of the channel does not visually appear to have changed much since the structure was installed in 1986. The last three springs have not produced large enough flood events to cause any significant channel changes.
2) RANDOM ROCKS l- The channel cross sections appear unchanged over the last two years.
3) RANDOM ROCKS 2- The channel cross sections appear unchanged over the last two years.
4) ROCK TRIO- The channel cross sections appear unchanged over the last two years.

ROCK WEIR- The channel cross sections appear unchanged over the last two years. There is an unexplained blip in the data for transect 3. The channel elevation 30 to 37 feet from the left bank (looking downstream) appears 3-4 feet higher than the channel bottom on either side, this is an obvious field note error.

Photo points were established in 1987 at 64 relocatable sites in the floodplain of the rehabilitated section of river. Photographs were taken at each of these sites in August or early September in 1987, 1988, and 1989.

1) Fifty of the photos showed vegetative increases. Increases were noted as taller, broader bushes or forbe clumps and new plants. Most of the new plants were forbes on disturbed or rocky areas. Some new woody plants were found in areas that had silt deposits.
2) Eight of the photos showed no change. These areas were extremely rocky and had no vegetation in 1987. A few of the small trees and woody shrubs showed apparent evidence of fertilizer burn from fertilizer spread in 1987. Others were stunted with signs of heavy grazing by deer and elk.

3) Six of the photos showed vegetative decreases. There are a few willow and cottonwood shoots (planted in 1986) that died after 1987. Other areas showed signs of severe deer and elk grazing.

Overall, the riparian vegetation is re-establishing itself in the floodplain of the rehabilitated section of stream channel. This visual monitoring will continue on a yearly basis and should document even greater changes as time passes.

SUMMARY AND CONCLUSIONS

The fishway and instream structures installed at the rehabilitation site appear to be functioning as planned, Chinook salmon redds were found in the Little Naches River above Salmon Falls in 1988 and 1989.

Although bedload accumulations which plug some of the weir orifices are occuring, the orifices are easily cleaned (for the most part) and although one orifice was left unplugged, it did not appear to be restricting fish passage.

Stream channel cross sections established in 1987 were surveyed in 1988 and 1989. Both 1988 and 1989 were low event years. No significant channel changes have occured during that time period.

Maintenance activities on the stream rehabilitation structures were determined not to be necessary during the 1989 season.

Riparian vegetation in the floodplain of the rehabilitated river section appears to be increasing in 78%, remaining the same in 13%, and decreasing in 9% of the established photo points.

SUMMARY OF EXPENDITURES

Agreement DE-AI79-86BP60266
Project 86-75

1988 EXPENDITURES

ITEM	JAN-SEP	OCT-DEC*	JAN-DEC*
PERSONNEL	1,661.25		
TRAVEL/TRANS.	354.60		
MATERIALS	35.36		
GENERAL ADMIN	328.19		
TOTAL	2,379.40	1,000	3,379.40

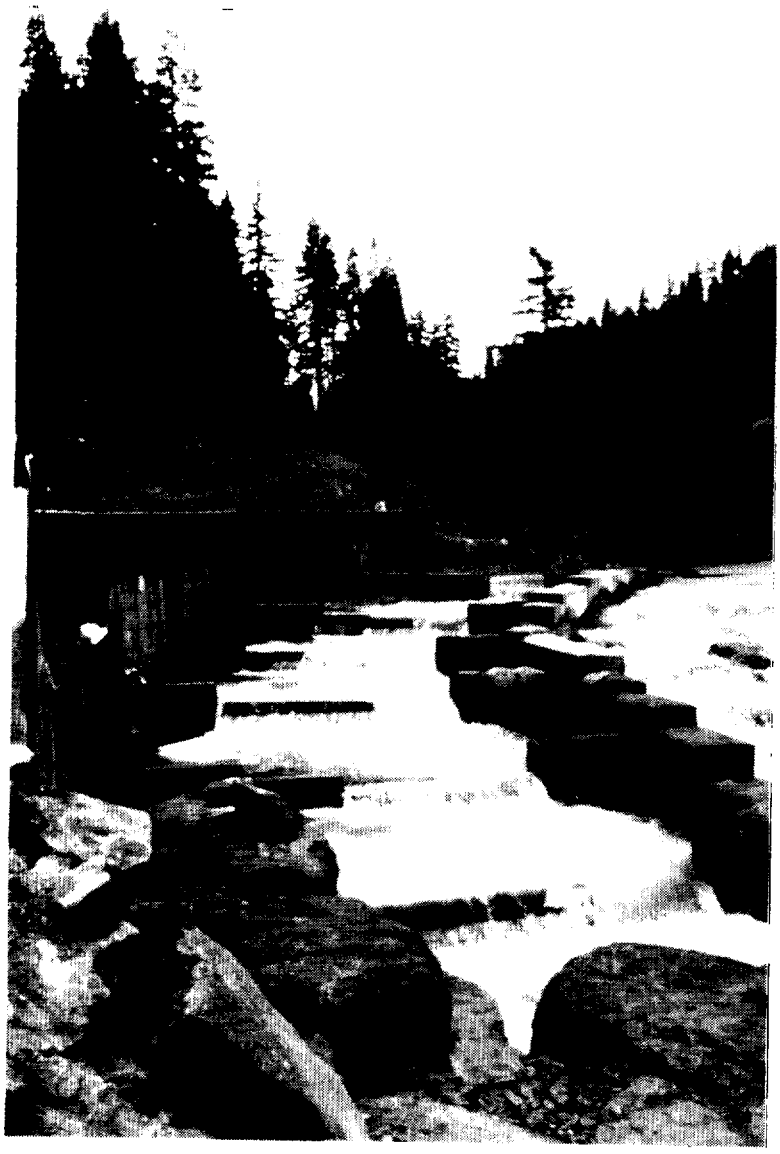
*January through September expenses are those actually billed BPA. October through December expenses are estimated.

MATERIAL ON FILE AT NACHES RANGER DISTRICT

Salmon Falls Fishway Construction and Safety Modification Construction Daily Diaries written by project COR John Fahsholtz and project inspectors Dan Soptich and Bev Ryder are located in the engineering department.

Diagrams showing locations of instream structures that were placed in the Rehabilitation Area and location of cross sections established to monitor future changes in the stream channel resulting from these structures are located in the fisheries department.

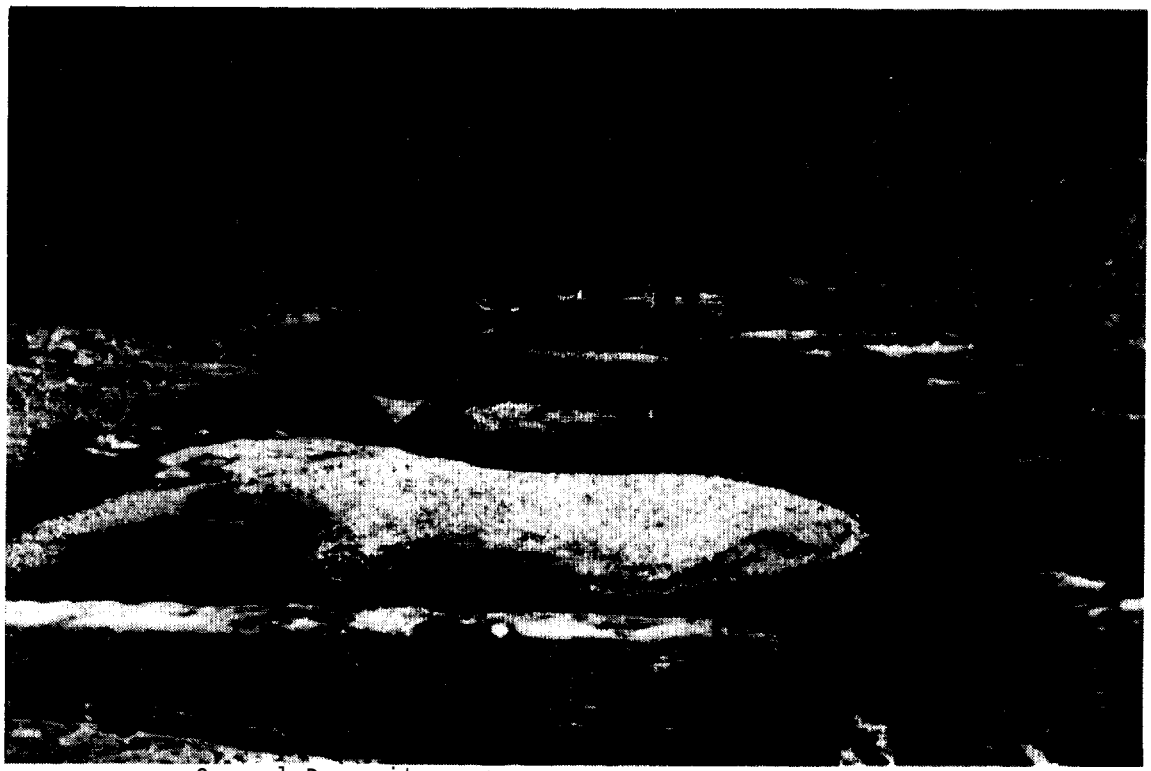
Pictures taken from established photo points in 1987, 1988 and 1989, as well as other miscellaneous photos of the project are located in the fisheries department.



Salmon Falls Fishladder
400 CFS May 27, 1988

Salmon Falls Fishladder
940 CFS May 9, 1989

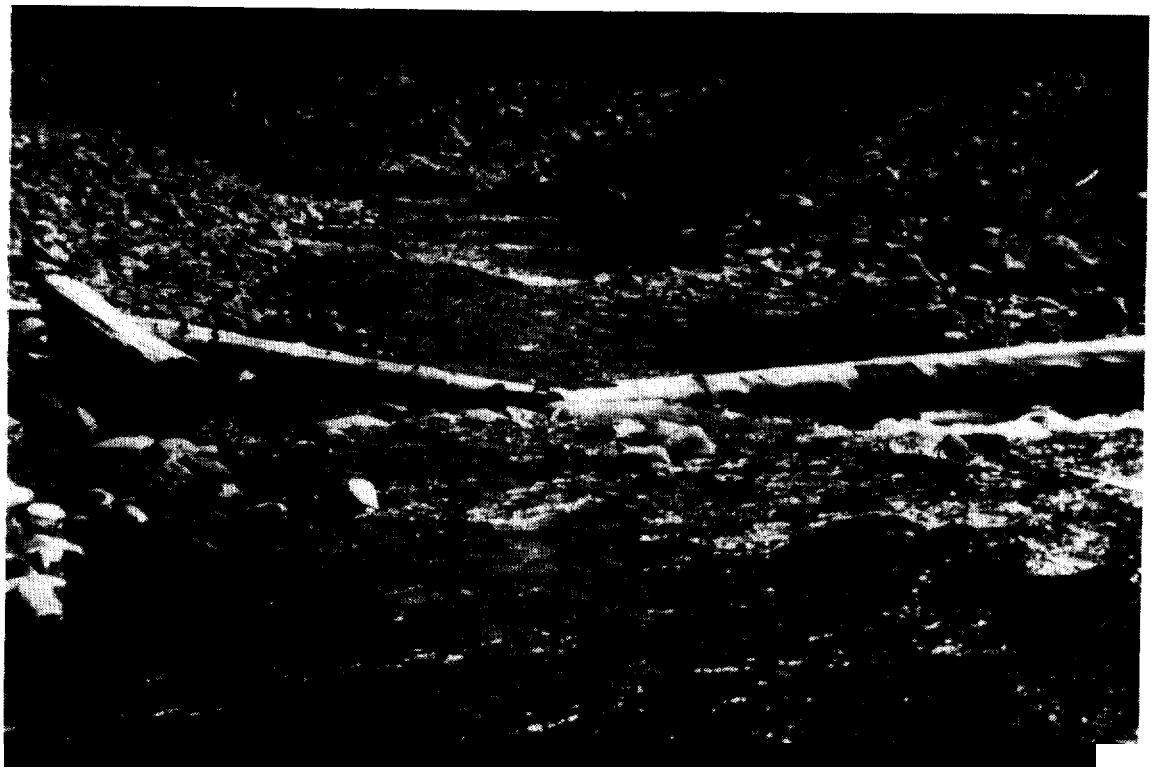
Aerial View of Salmon Falls Fishway
240 CFS June 9, 1988



Gravel Deposit Upstream of Salmon Falls Fishway
240 CFS June 9, 1989

Gravel Deposits in Salmon Falls Fishway
August 1, 1989

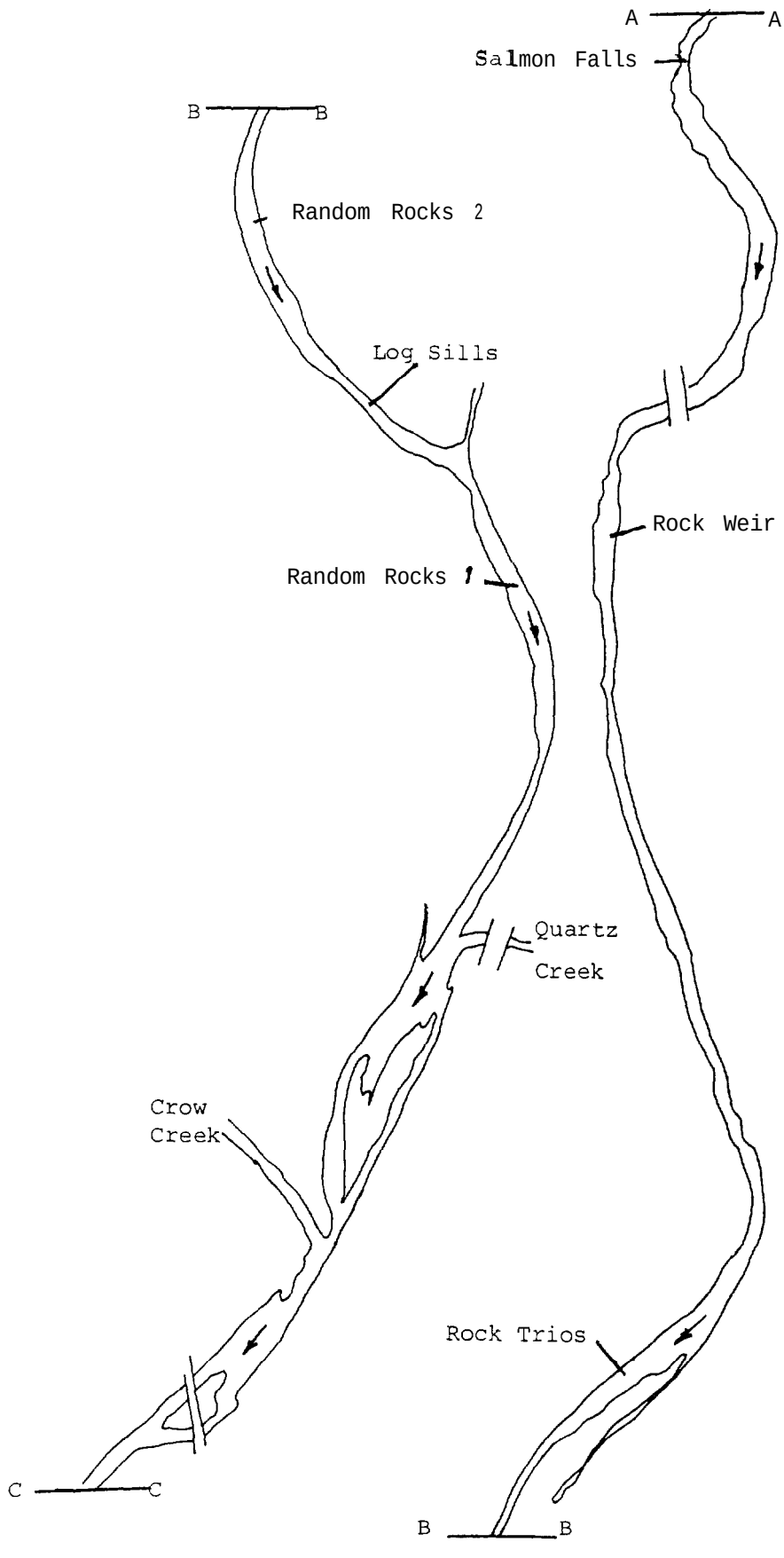
Gravel Deposits in Salmon Falls Fishway
August 1, 1989



Downstream-most Log V-Weir
30 CFS August 24, 1989

Measuring Stream Channel Cross-Sections

Measuring Stream Channel Cross-Sections



Map showing location of transects established to monitor effects of instream structures placed in Little Naches River

ROCK WEIR 3

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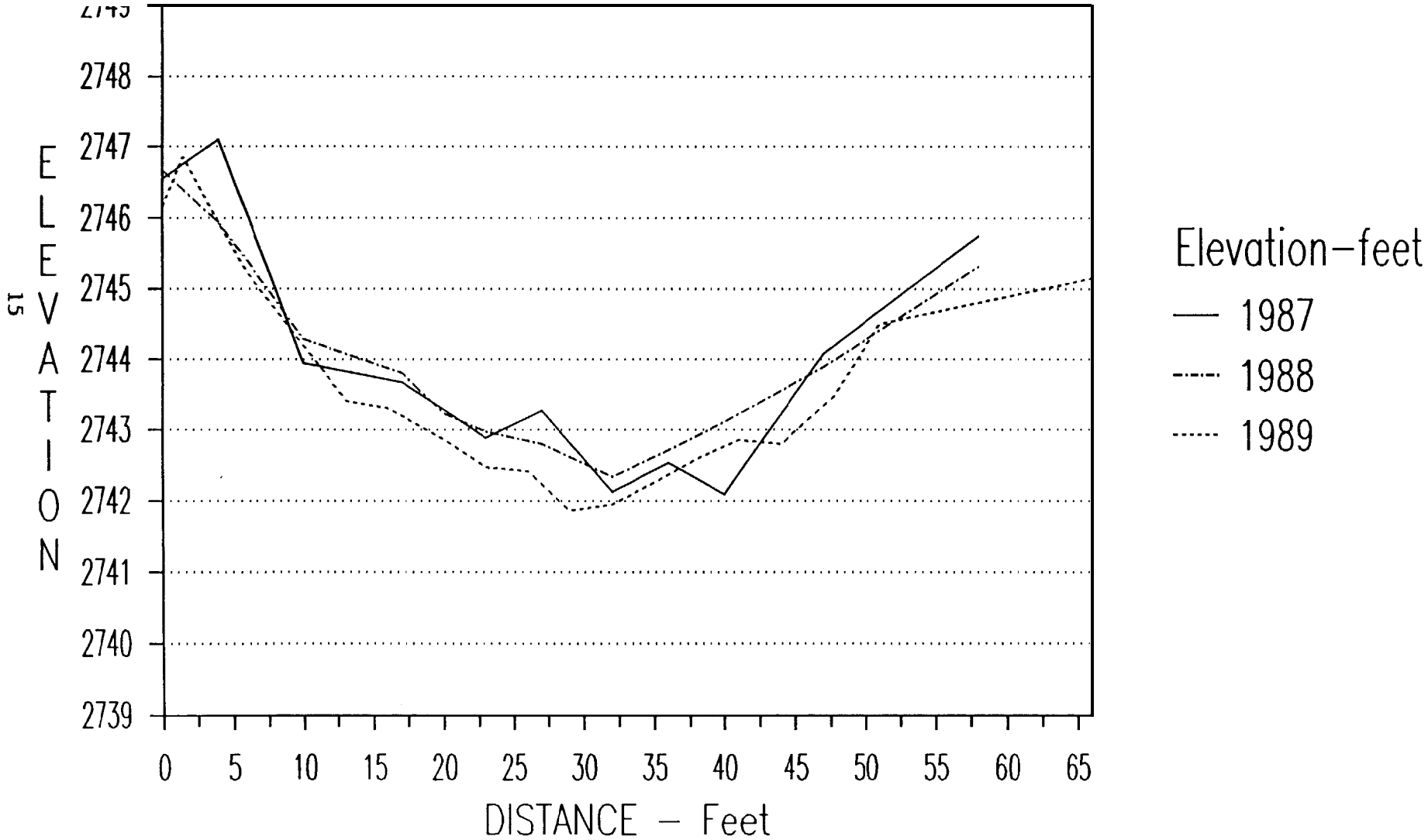

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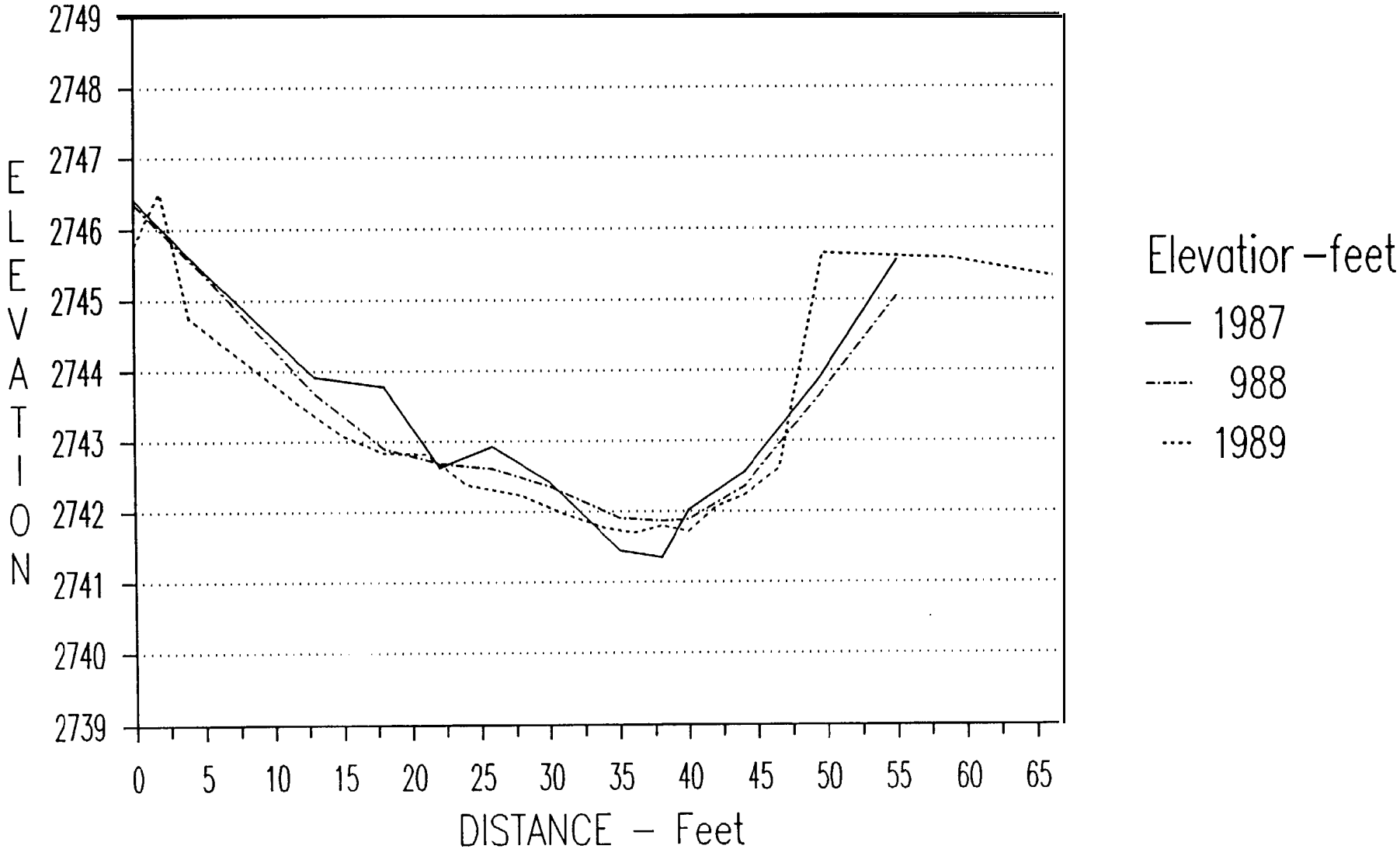

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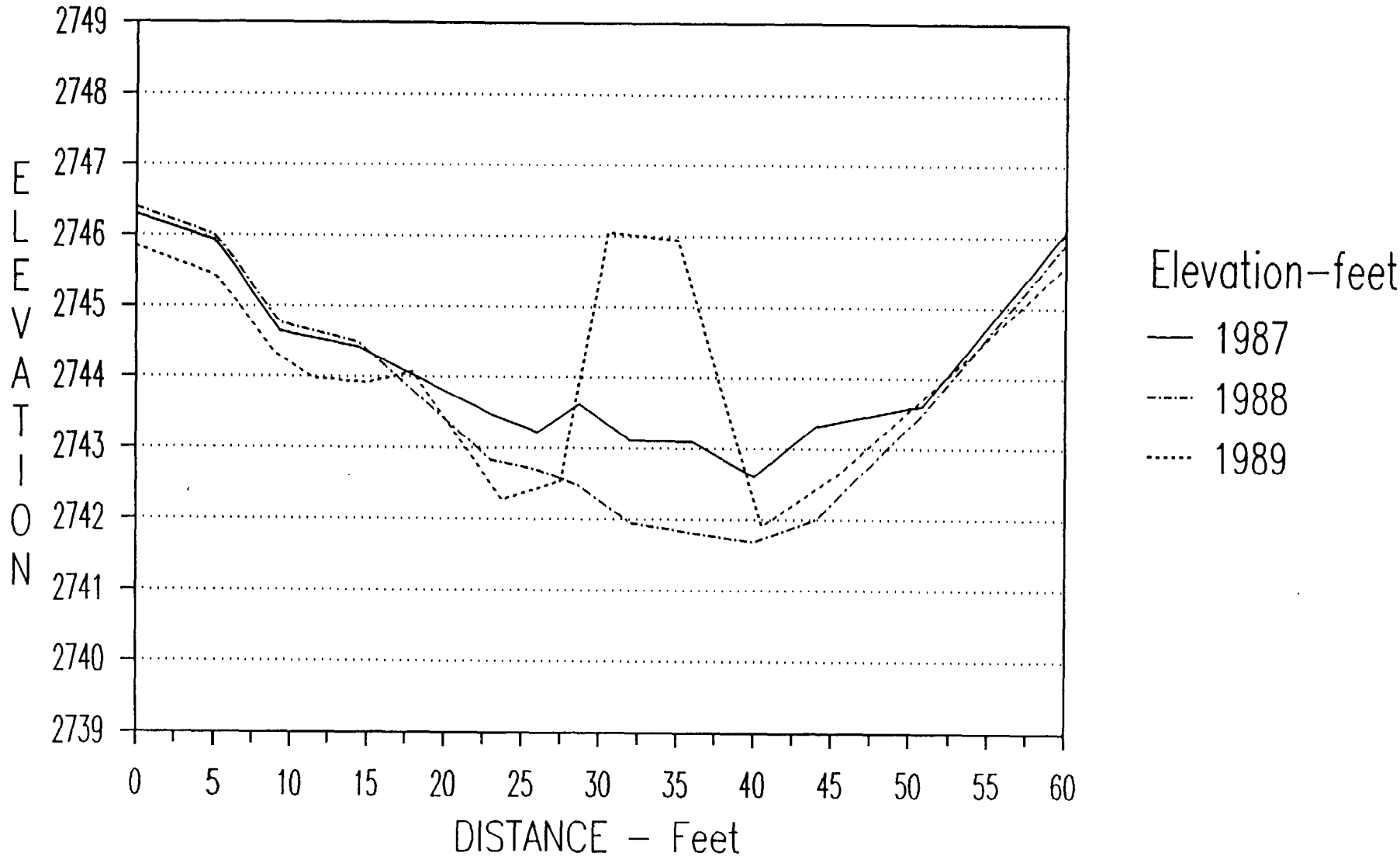

ROCK WEIR 3

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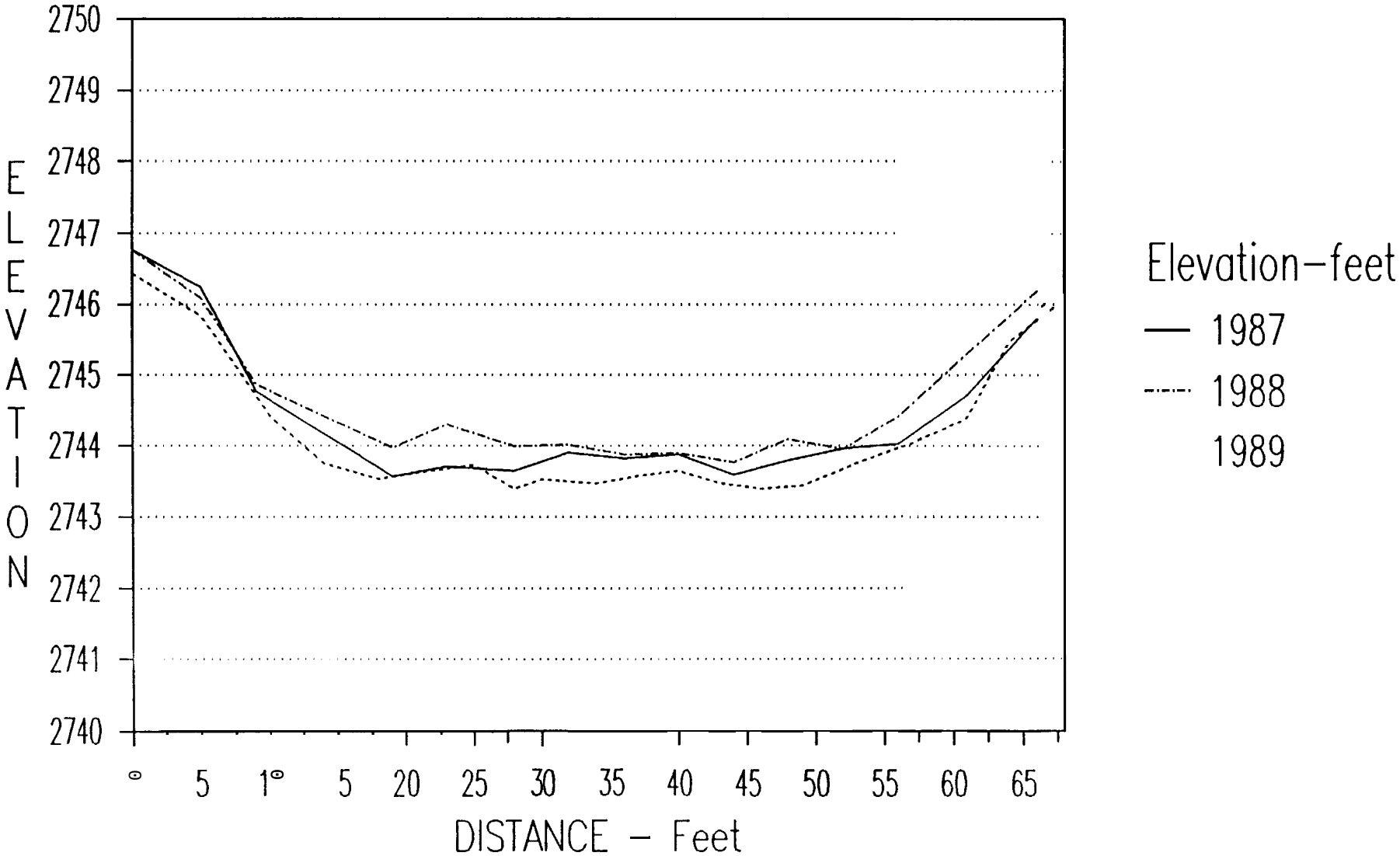

ROCK WEIR 3

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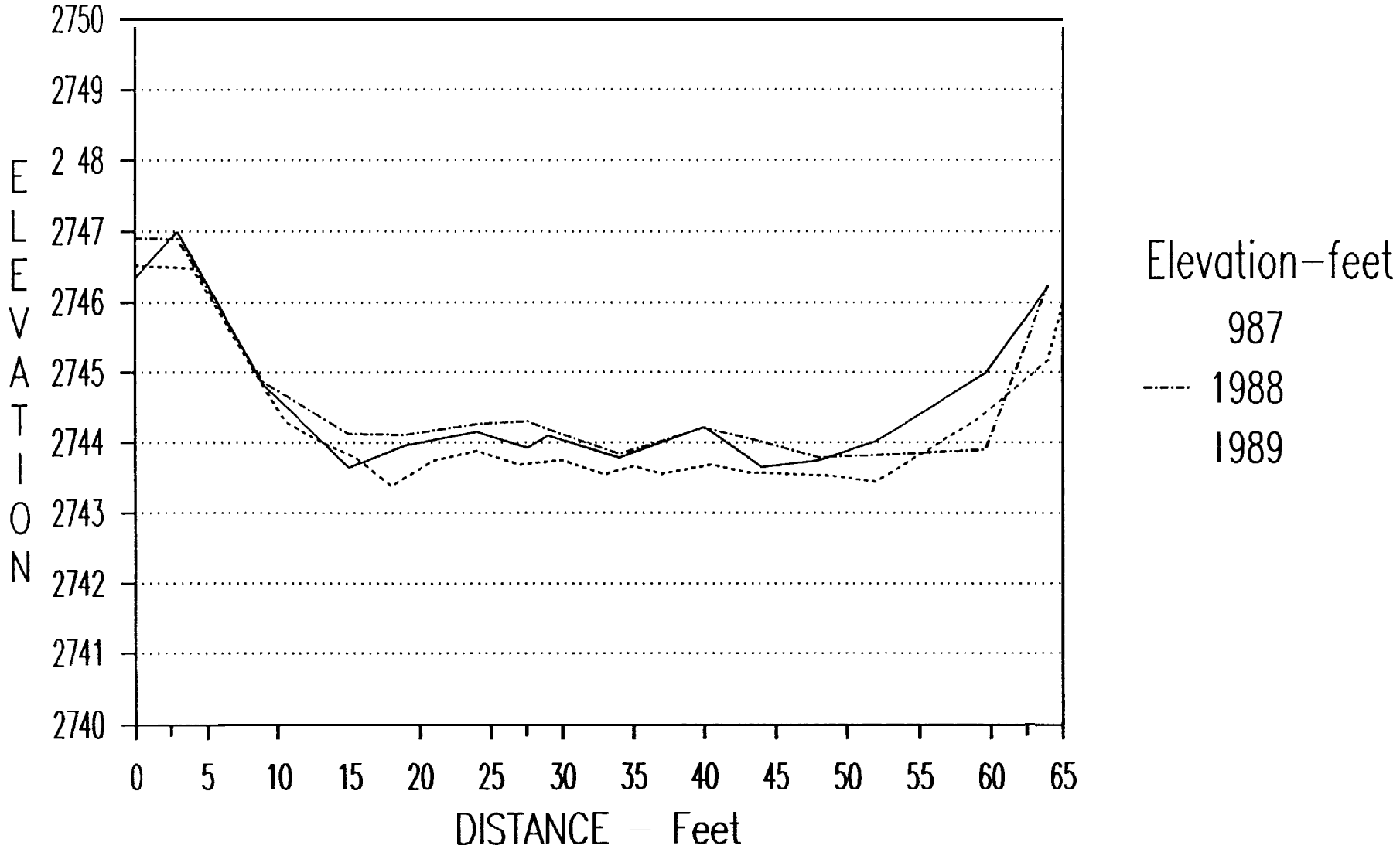

ROCK TRIOS

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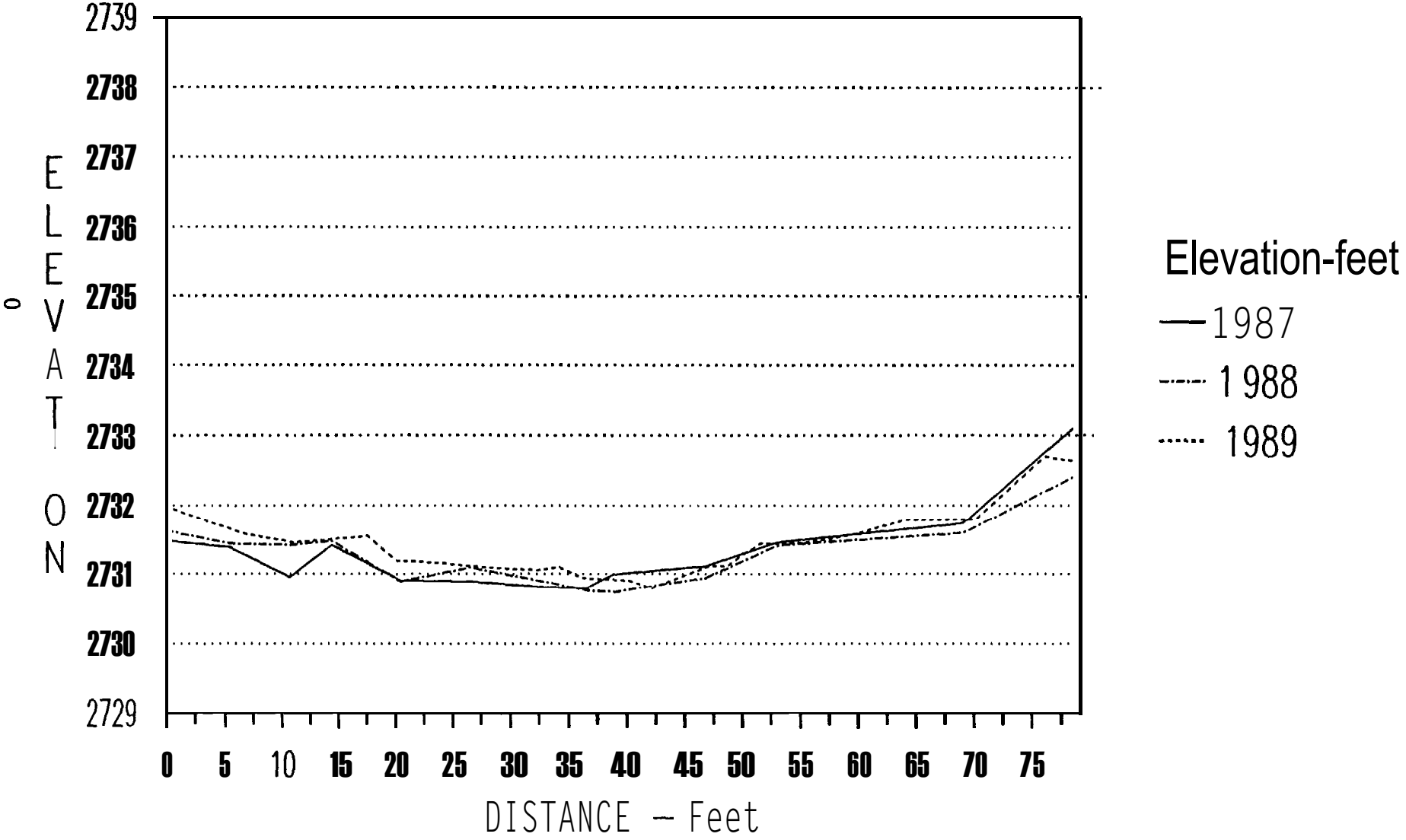

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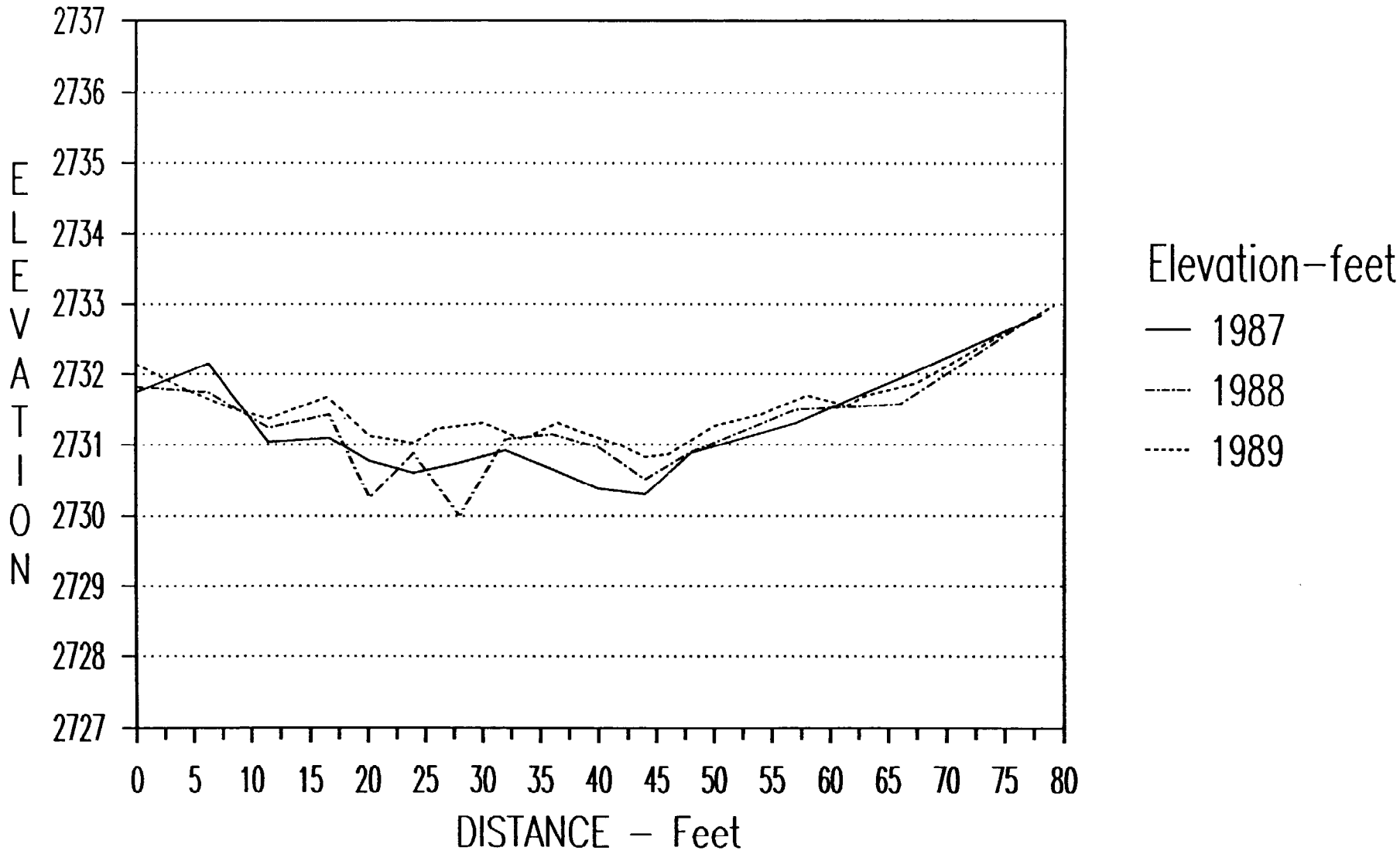

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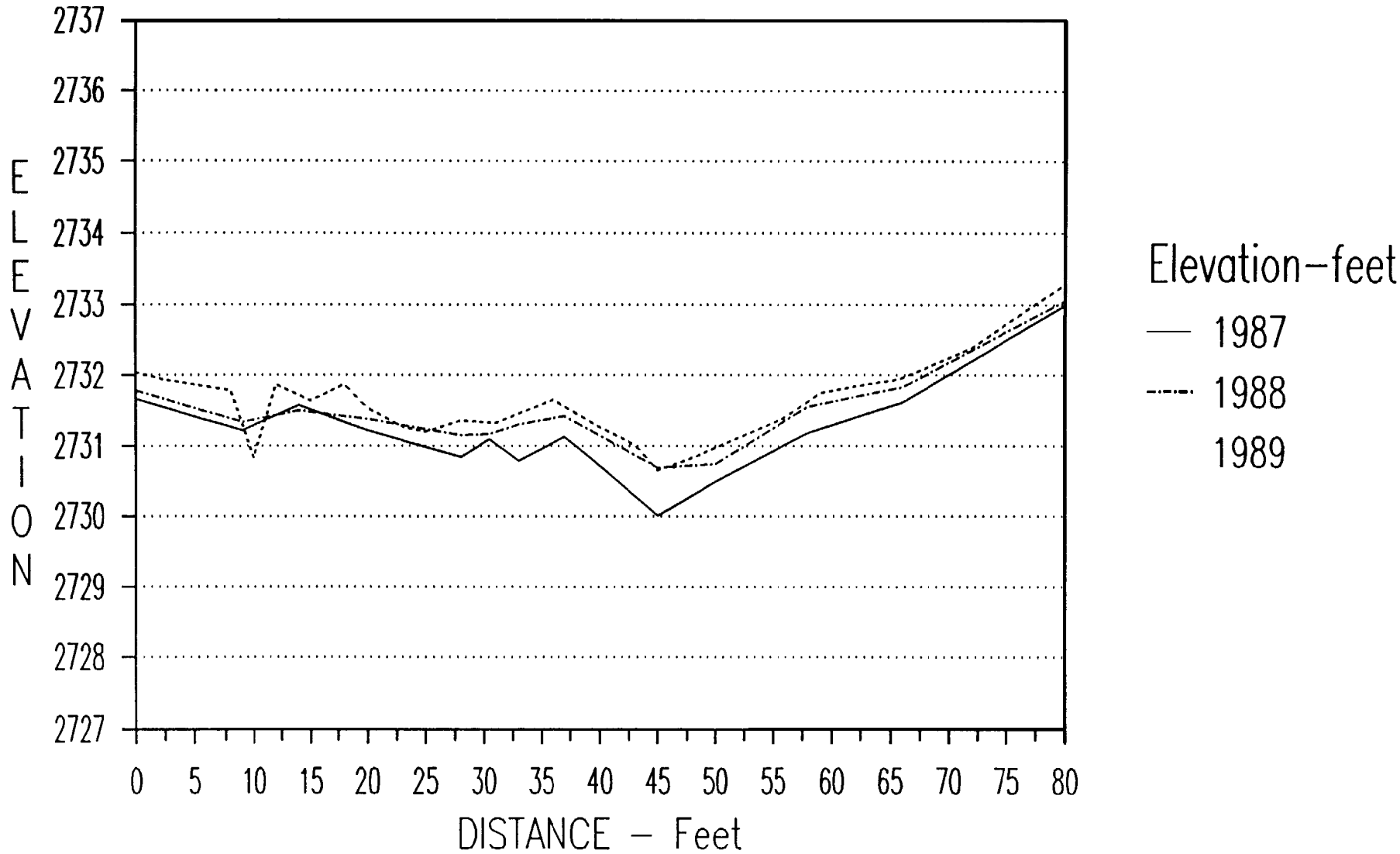

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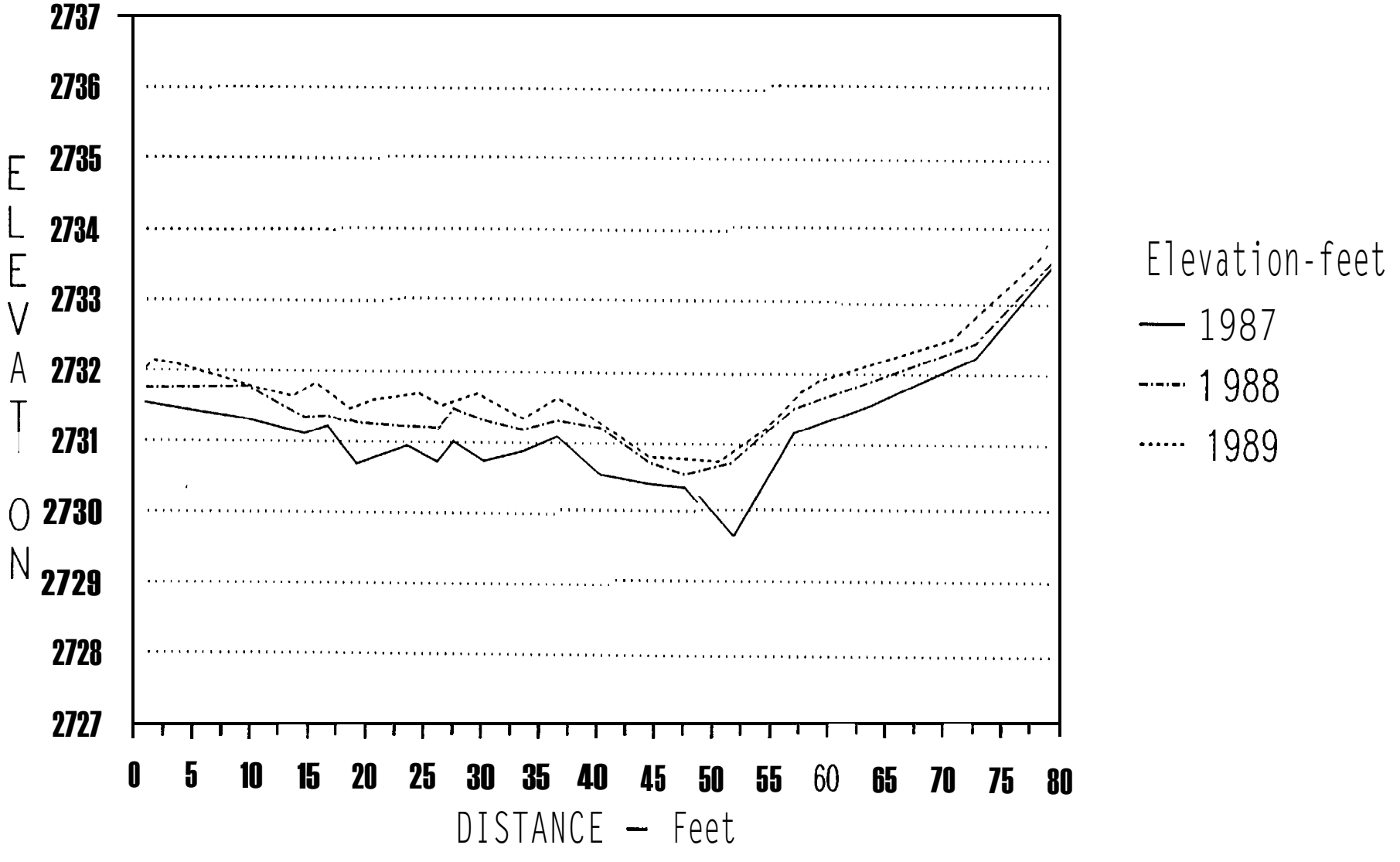

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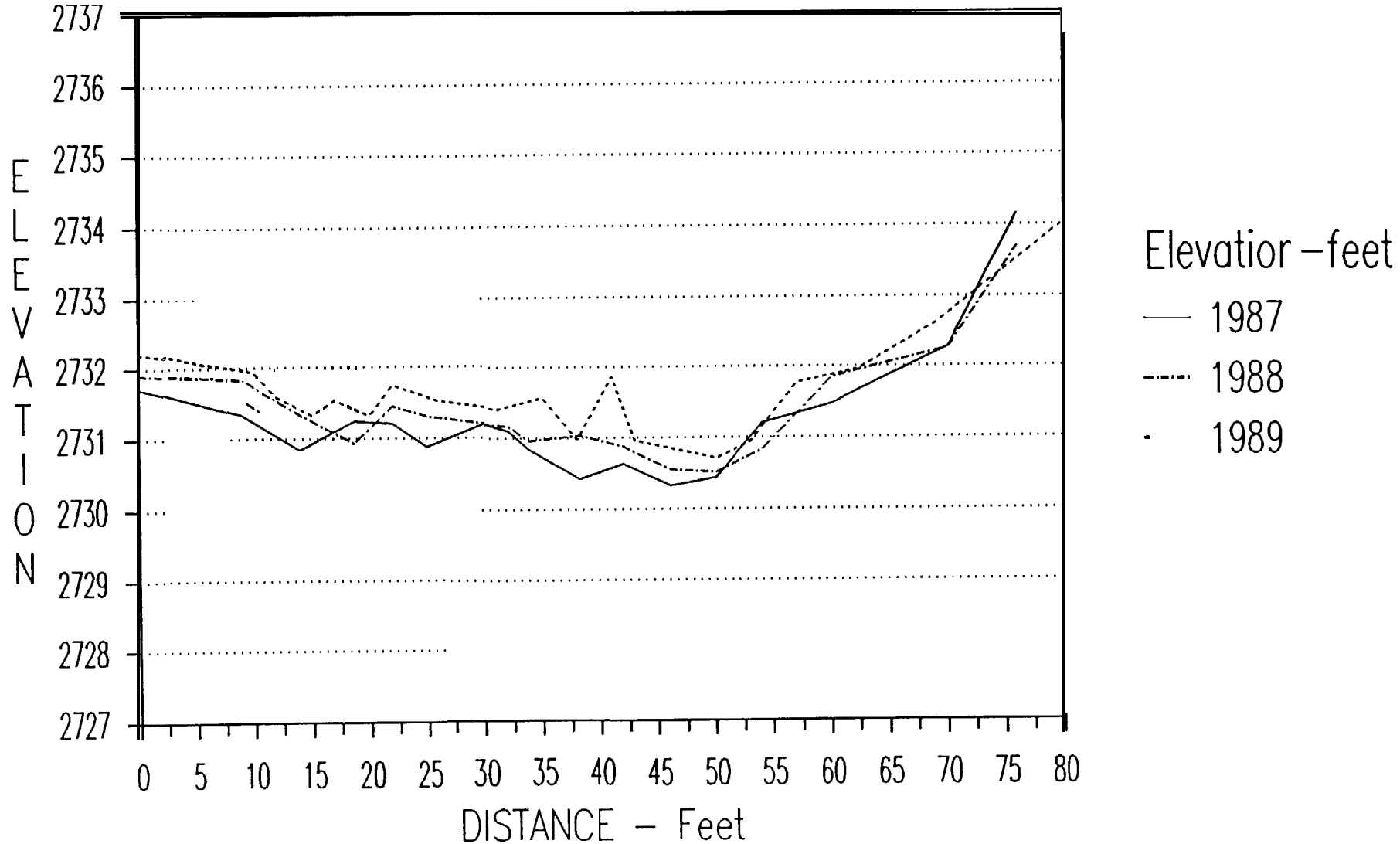

RANDOM ROCKS 2

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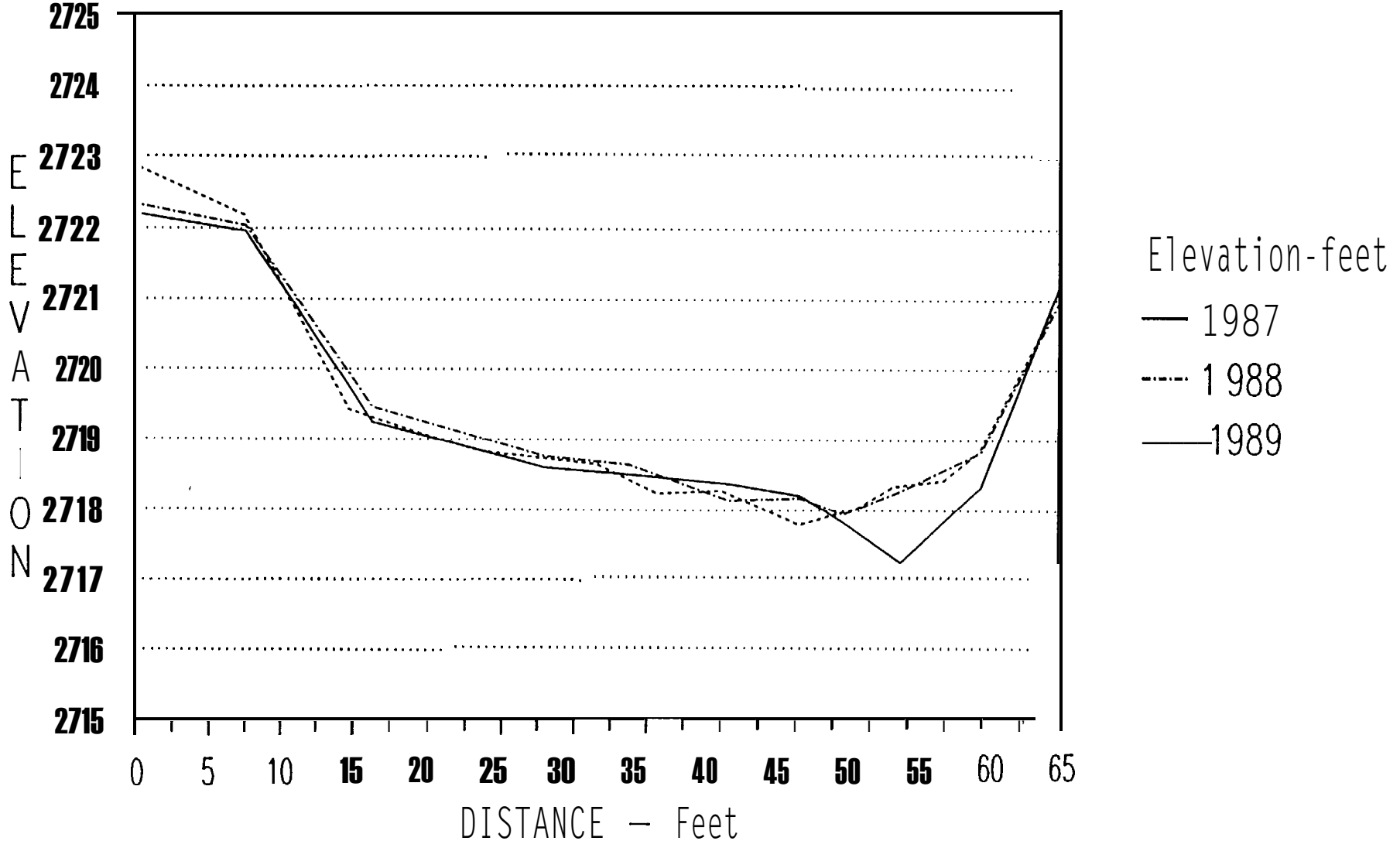

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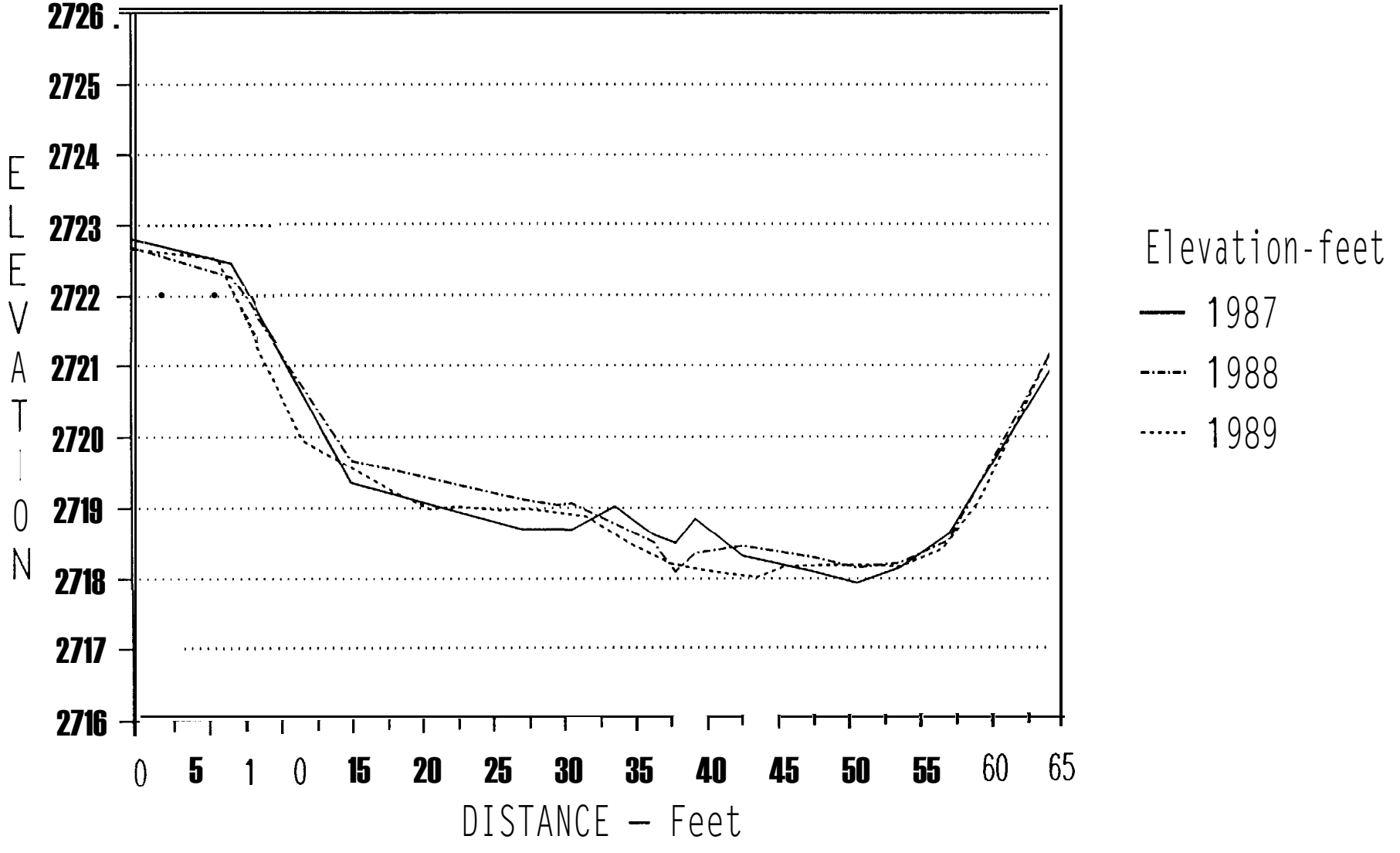

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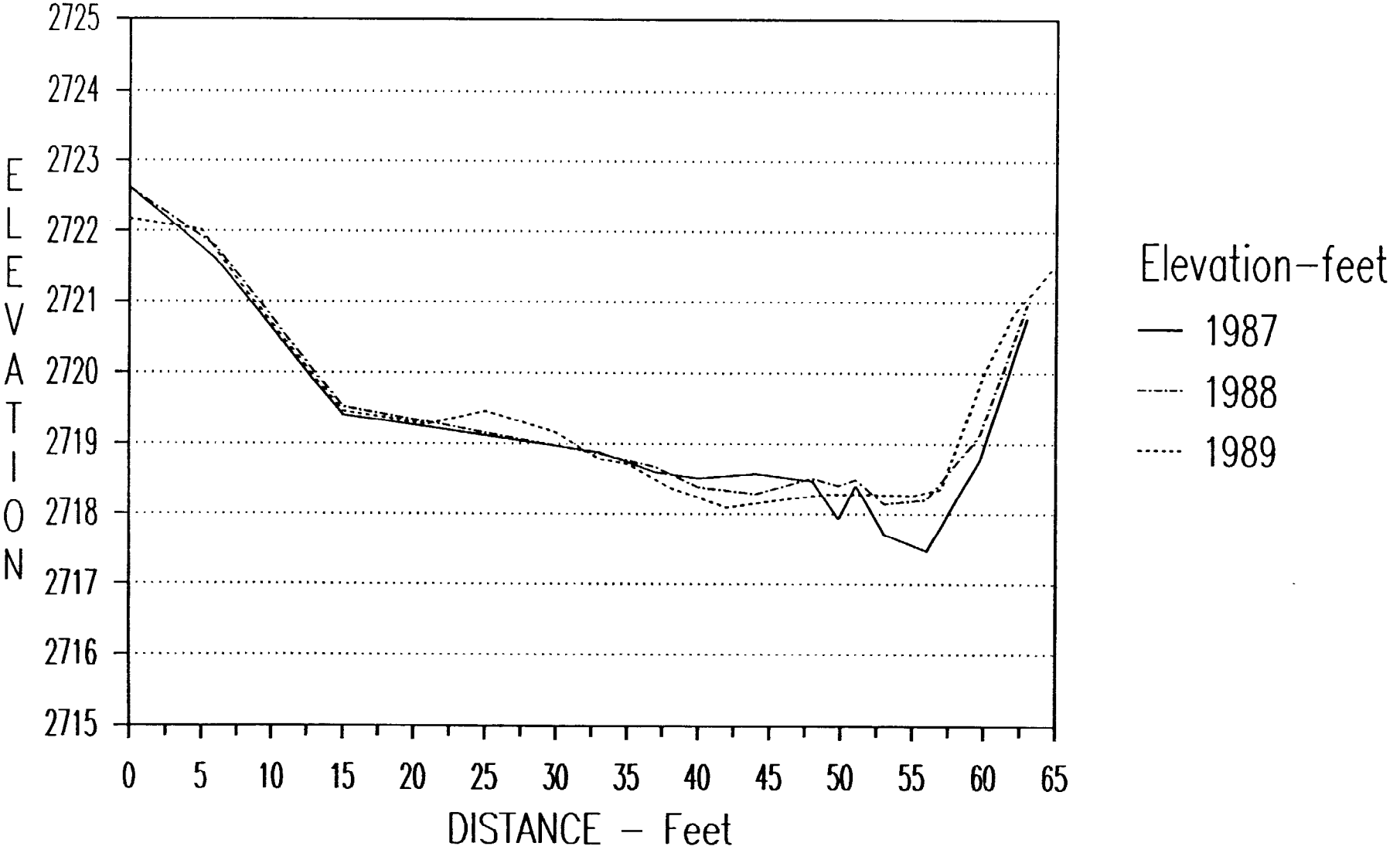

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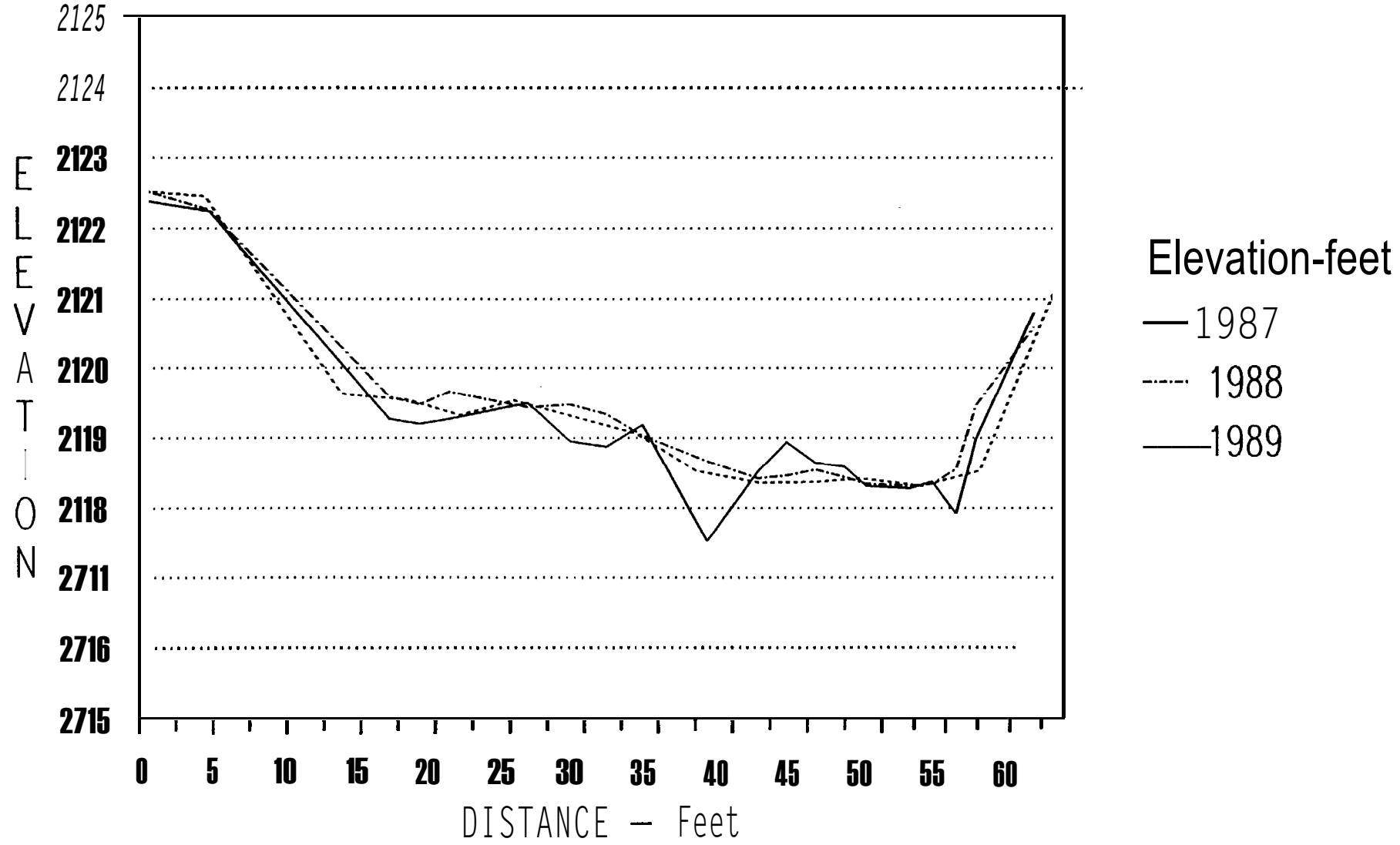

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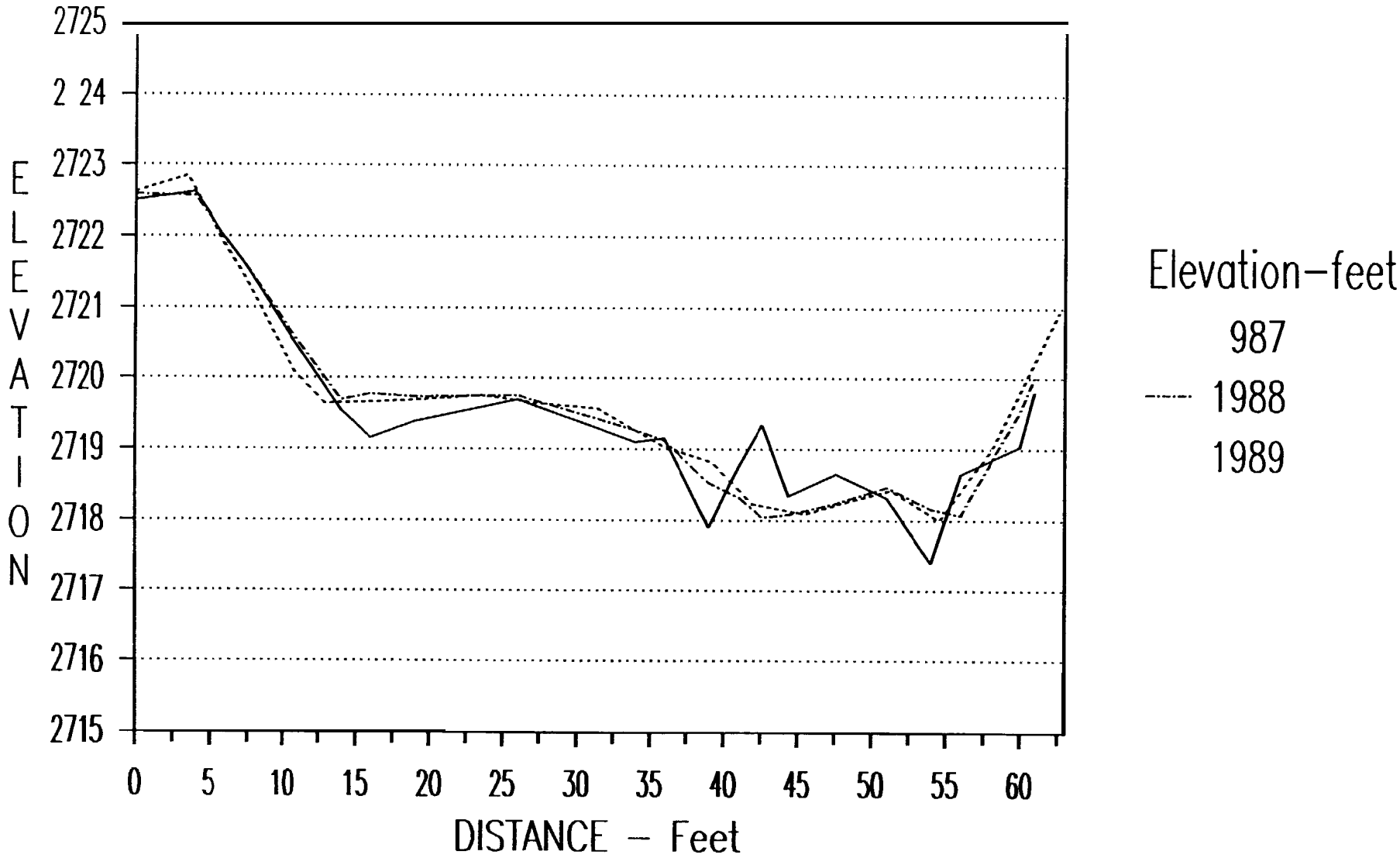

LOG SILLS

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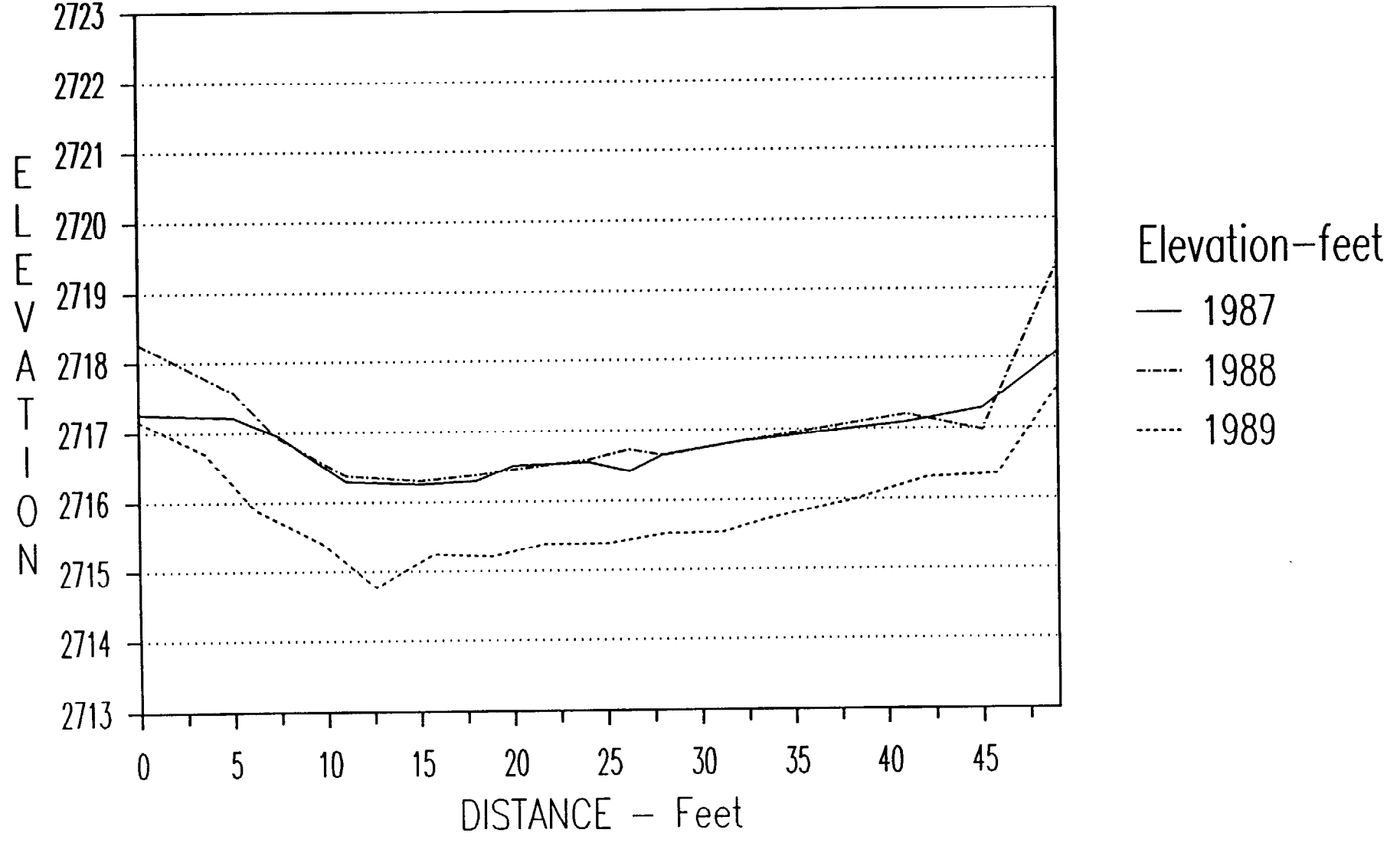

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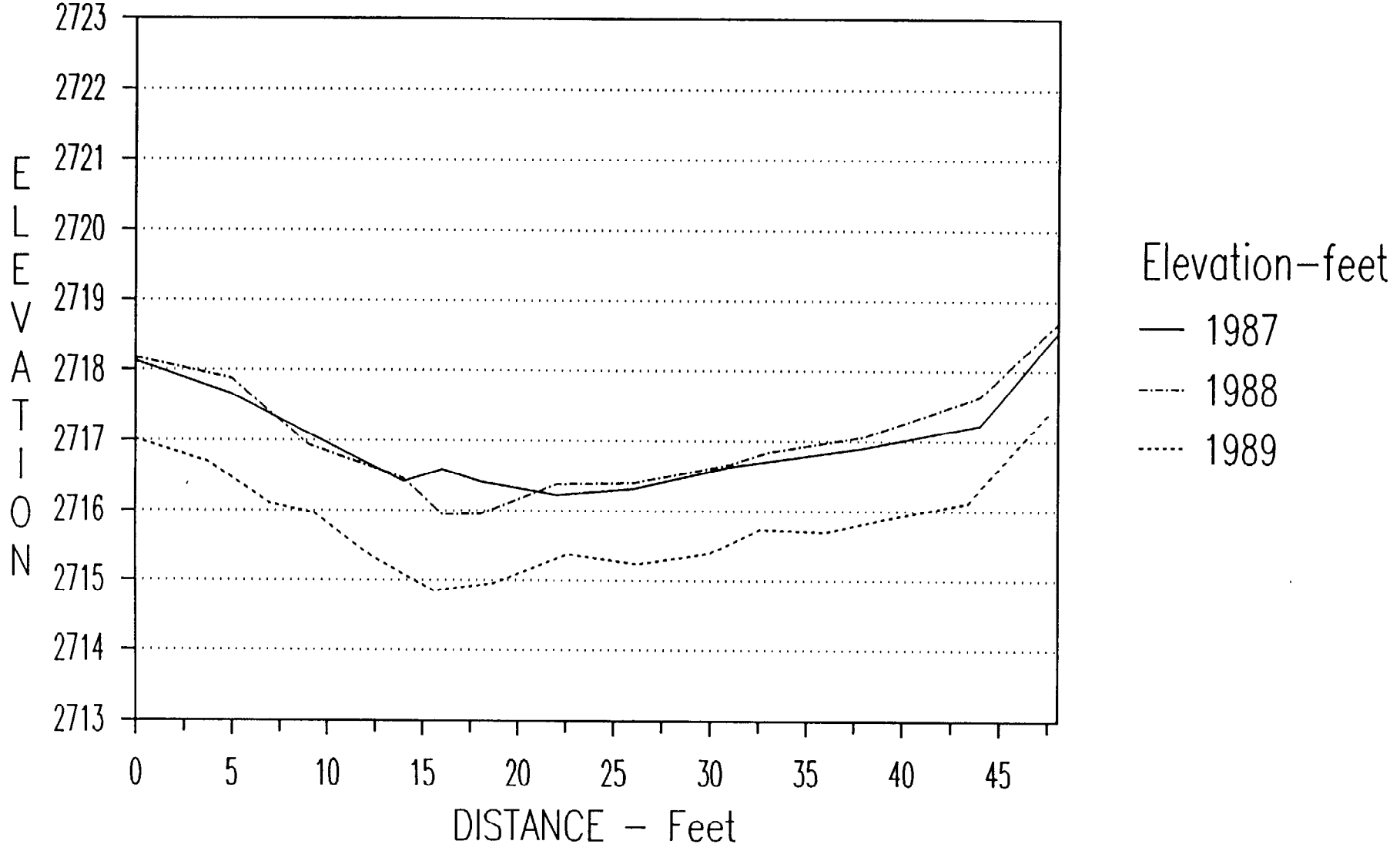

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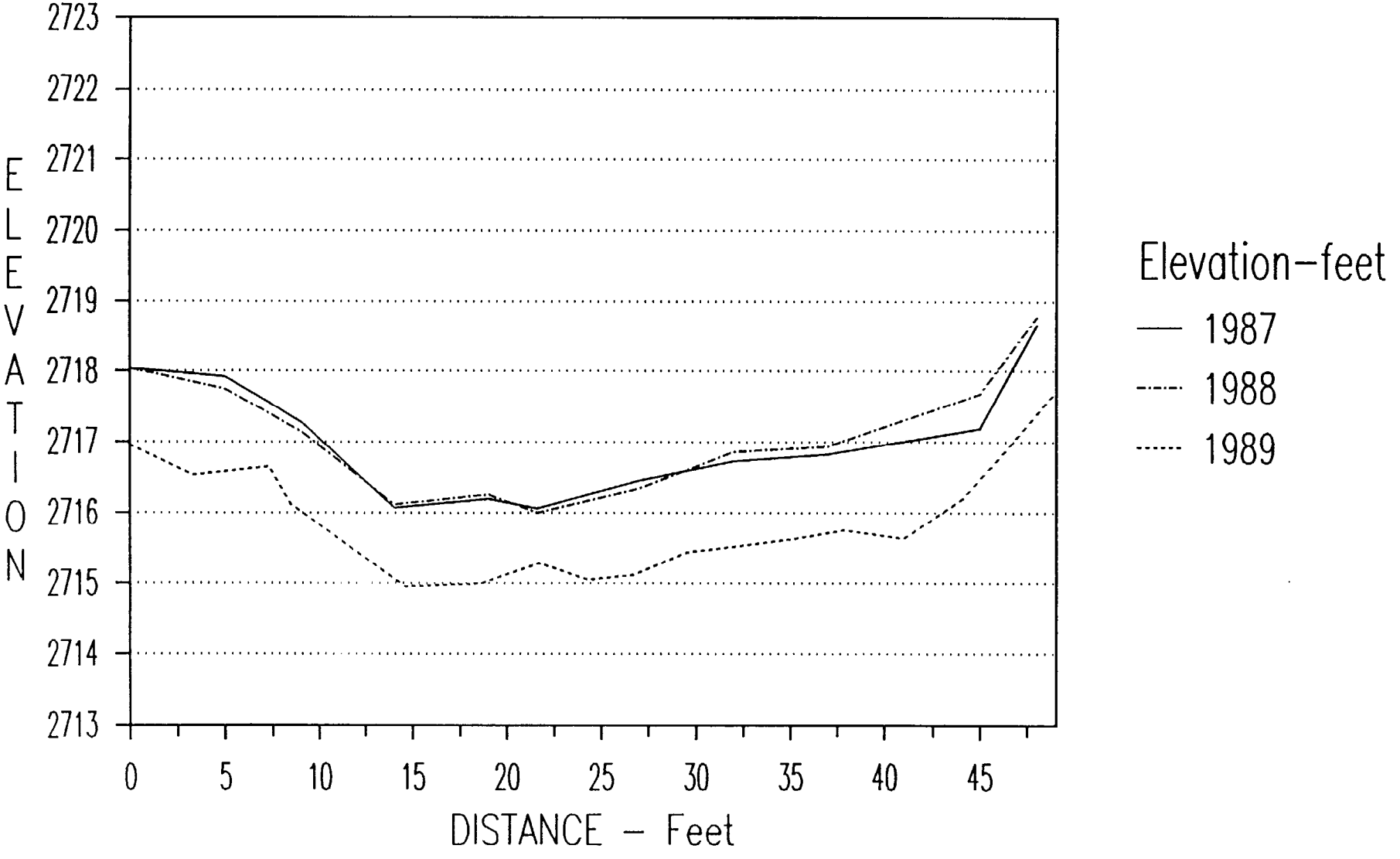

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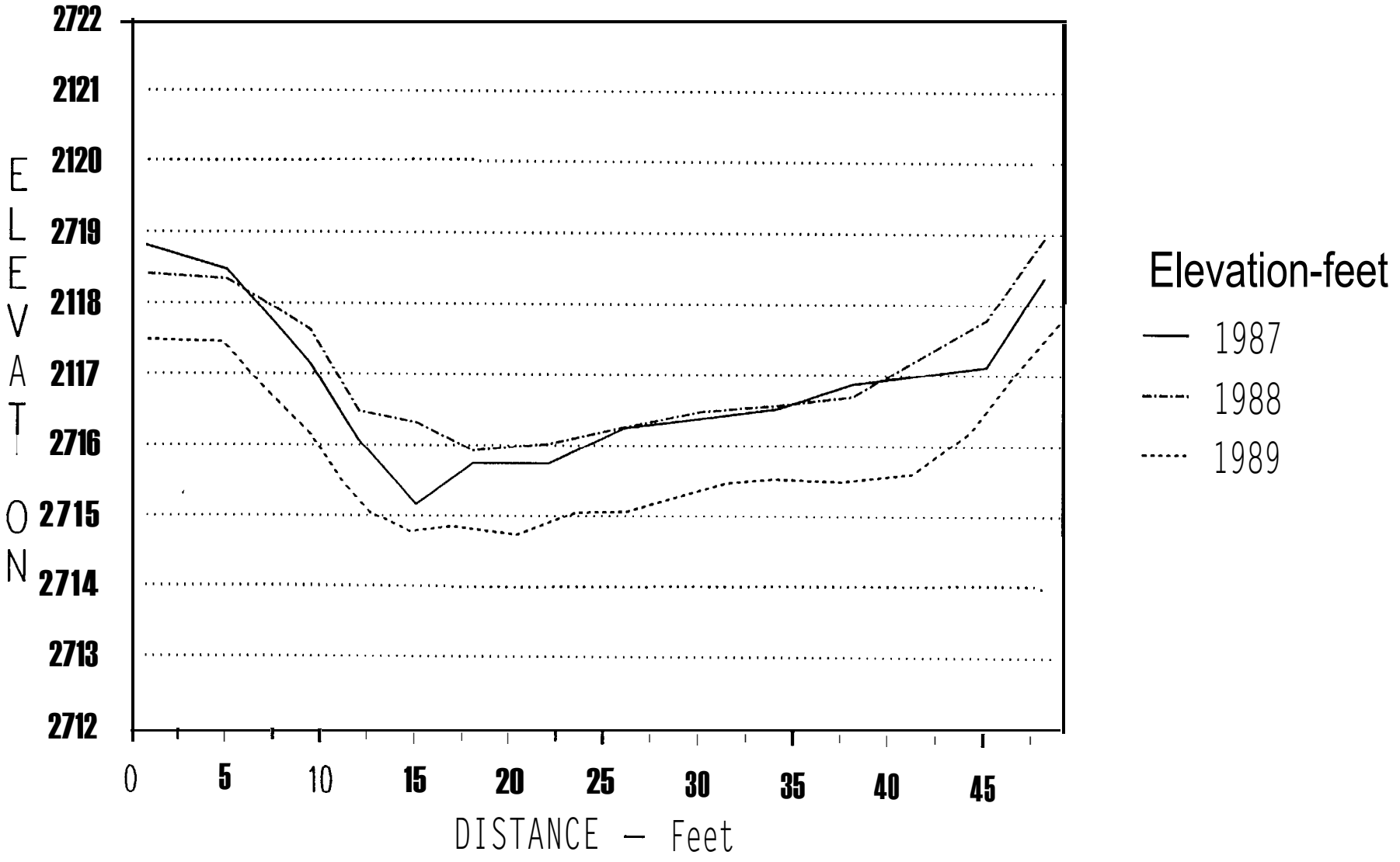

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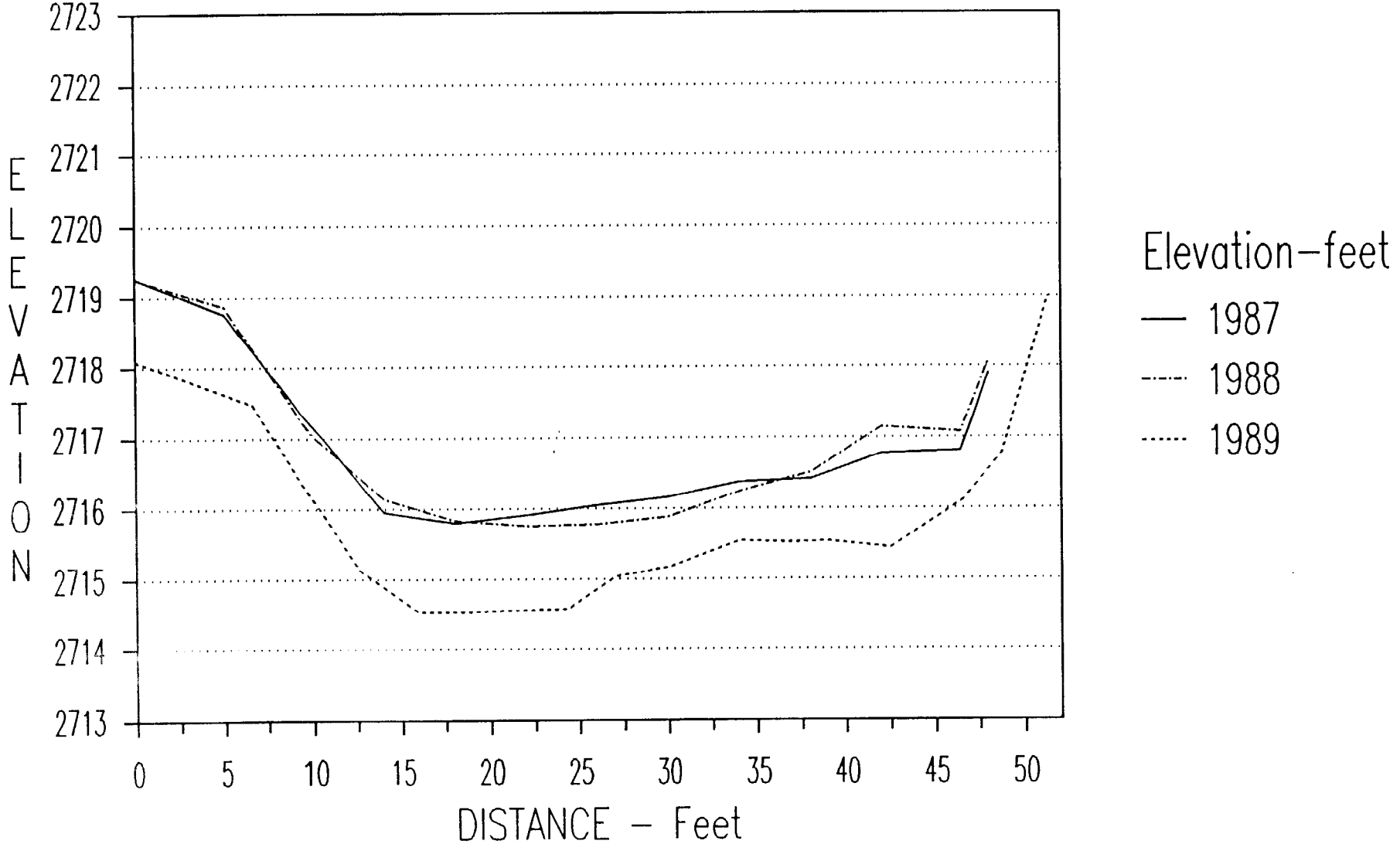

RANDOM ROCKS 1

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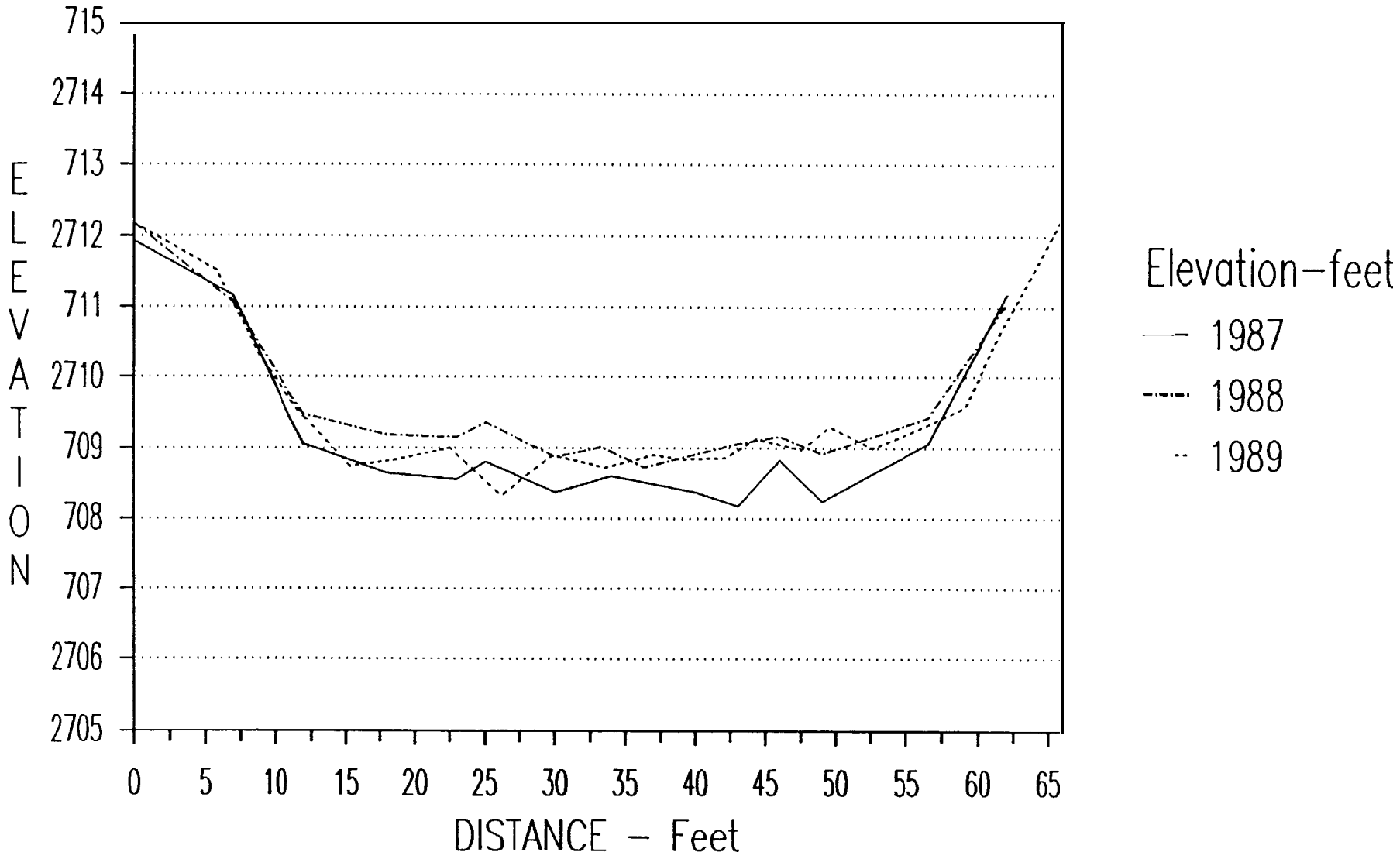

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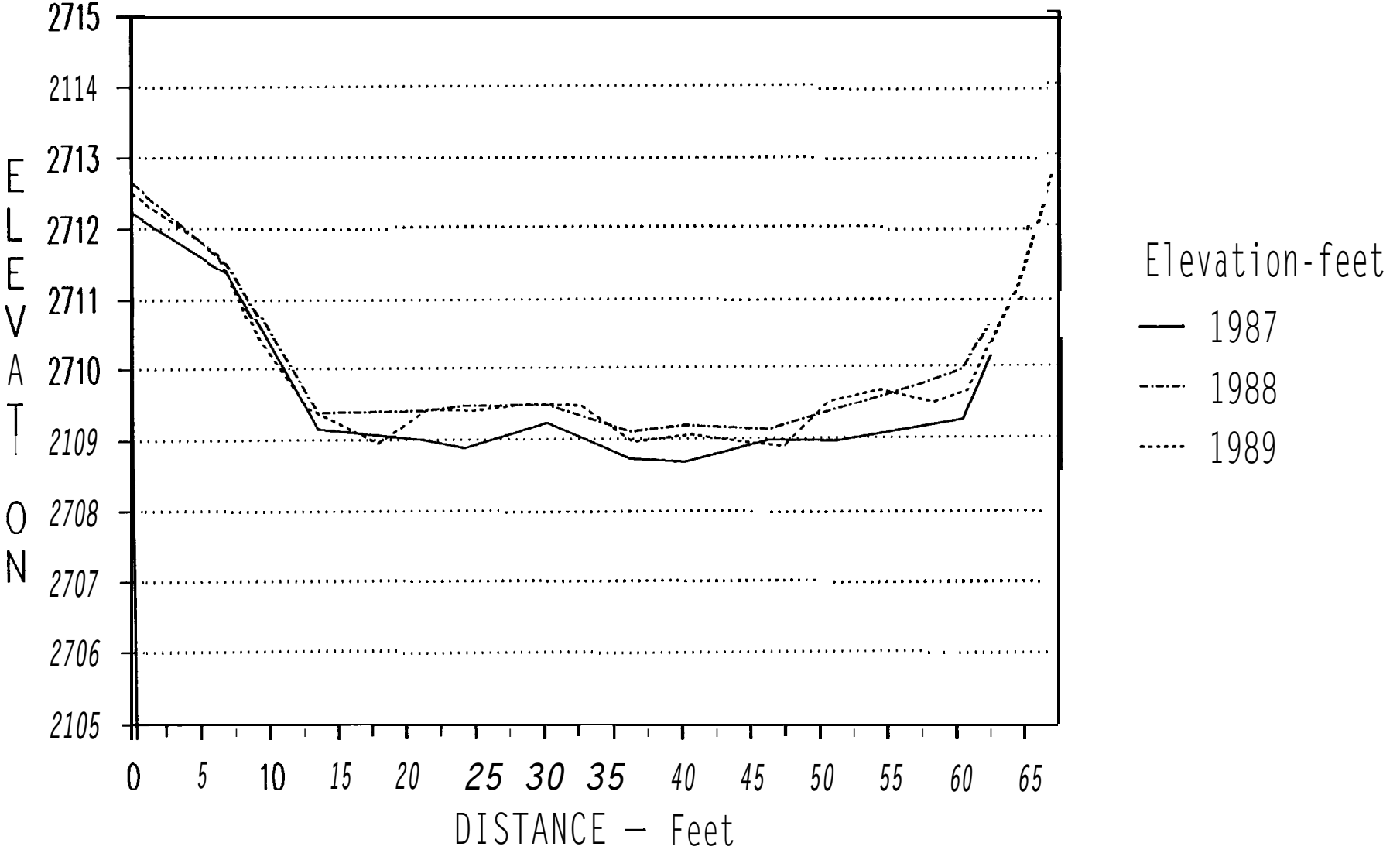

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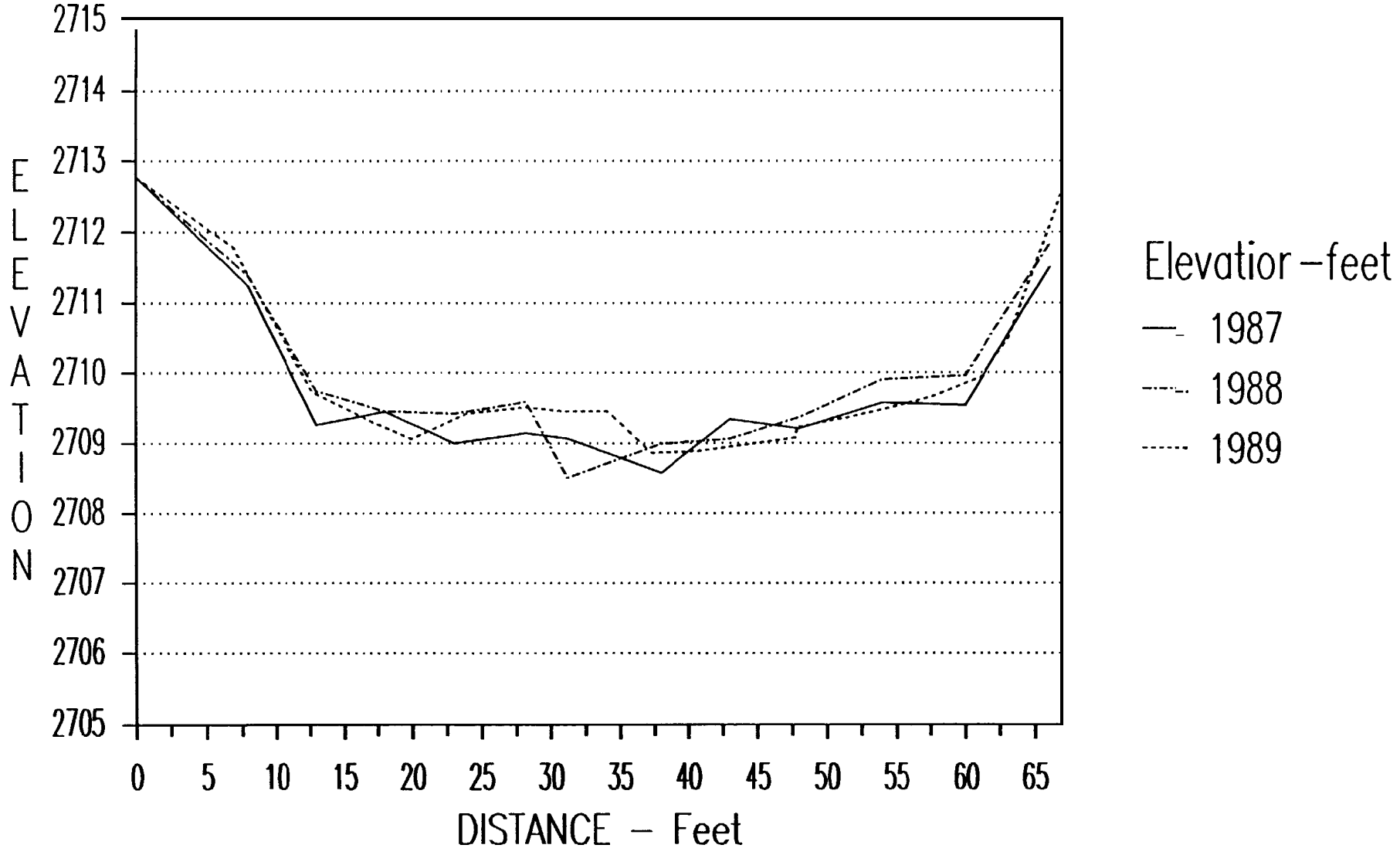

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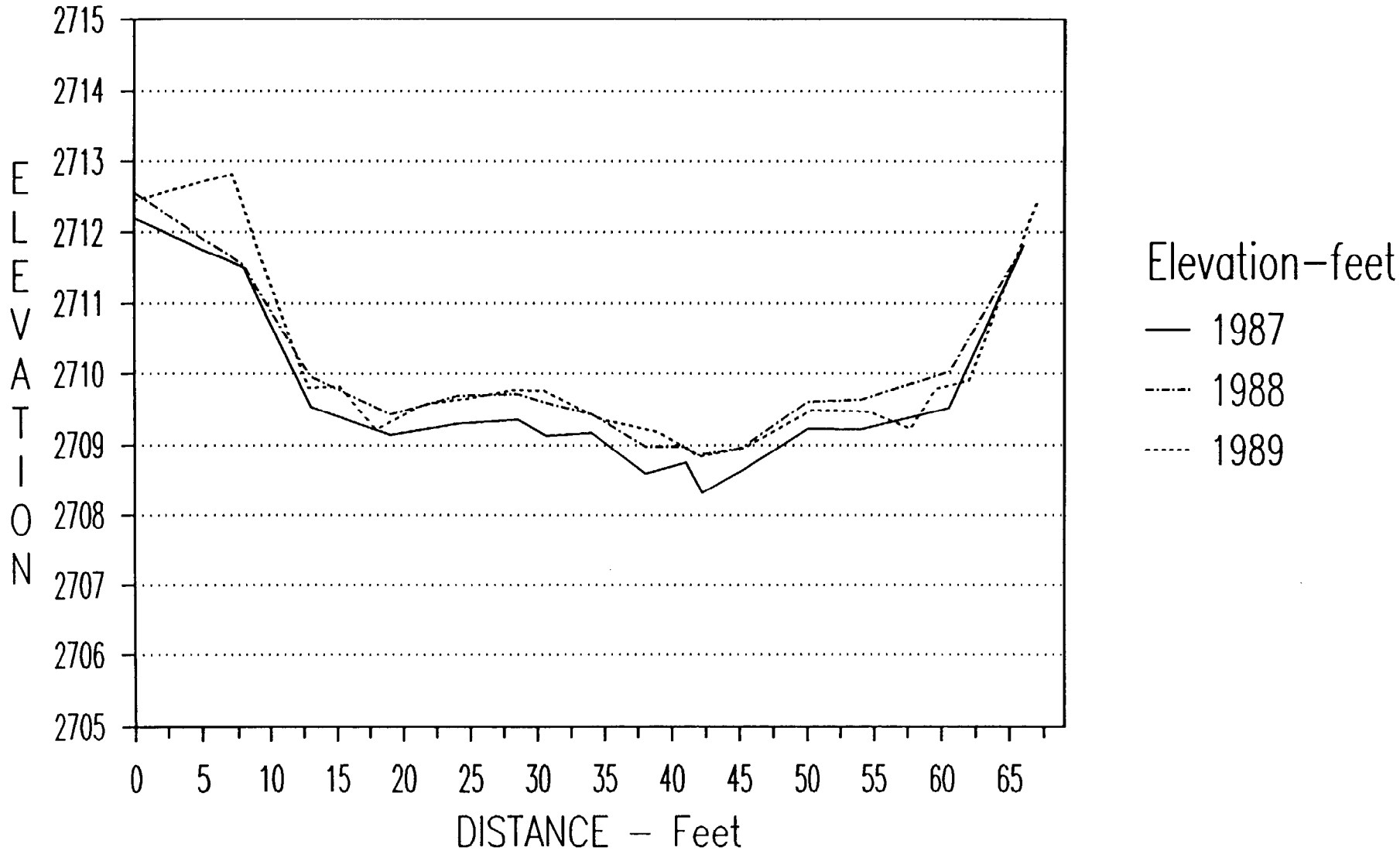

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